SIEMENS

MOBY® E

Configuration, Installation and Service

Manual

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Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

Caution

indicates that minor personal injury or property damage can result if proper precautions are not taken.

Note

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

The device/system may only be set up and operated in conjunction with this manual.

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

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We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

Technical data subject to change without prior notice

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General

1

This configuration, installation and service manual will help you to plan and configure your Moby E system. It covers the guidelines on configuration and installation and provides complete technical data on the individual components.

MOBY hotline

A MOBY hotline has been set up for optimum customer service to MOBY customers.

We are available under the following telephone numbers from 8:30 AM to 11:30 AM and from 1:00 PM to 4:00 PM Mondays through Fridays:

++49 911/750-2859
++49 911/750-2861
++49 911/750-4684
++49 911/750-4659

Our hotline is not available on the Friday or Monday prior to or following legal holidays.

Of course, you can also fax us your questions or send them via Internet.

Fax: ++49 911/750-2800 or 750-2960
e-mail-address: MOBY.HOTLINE@fthw.siemens.de

Internet

General news on Moby E or an overview of our other identification systems are available on the Internet under the following address.

http://www.ad.siemens.de/moby

e-mail

In addition, you can send us your special questions on products, Siemens representatives in your area, customer-related requirements and so on at the following e-mail address:

moby@fthw.siemens.de

Introduction to MOBY E

2

MOBY E is an RF identification system with low-cost EEPROM data storage for optimization of material handling and production processes for the low-end and medium-range performance level. This powerful system offers high-speed data transmission between data memories (i.e., MDSs) and read/write devices (i.e., SLGs).

Principal application areas

MOBY E is primarily used when object identification must be inductive (i.e., without contact), reliable and fast and production and manufacturing parameters must be carried on the object.

- Storage, logistics, and distribution
- Merchandise distribution
- Product identification
- Container identification
- Assembly lines
- Tool identification

Technical data of MOBY E

Table 2-1 Technical data of MOBY E (field components)

Storage capacity	752 bytes for use as desired
Memory type	EEPROM
Data organization	Address-oriented
Protection rating	IP 65 to IP 68
Operating temperature	-25° to +125° C
Data transmission speed (SLG - MDS)	≥ 2.55 msec/byte read-accesses ≥ 2.8 msec/byte write-accesses
Read/write distance	0 to 100 mm
Can be connected to	SIMATIC S5/S7, PCs, computers, PLCs of other manufacturers, and PROFIBUS

Overview of MOBY E components

- MDS: (mobile data memory)
- SLA: (read/write antenna)
- SLG: (read/write device)
- SIM: (serial interface module)
- ASM: (interface module)
- STG E: (service and test device)

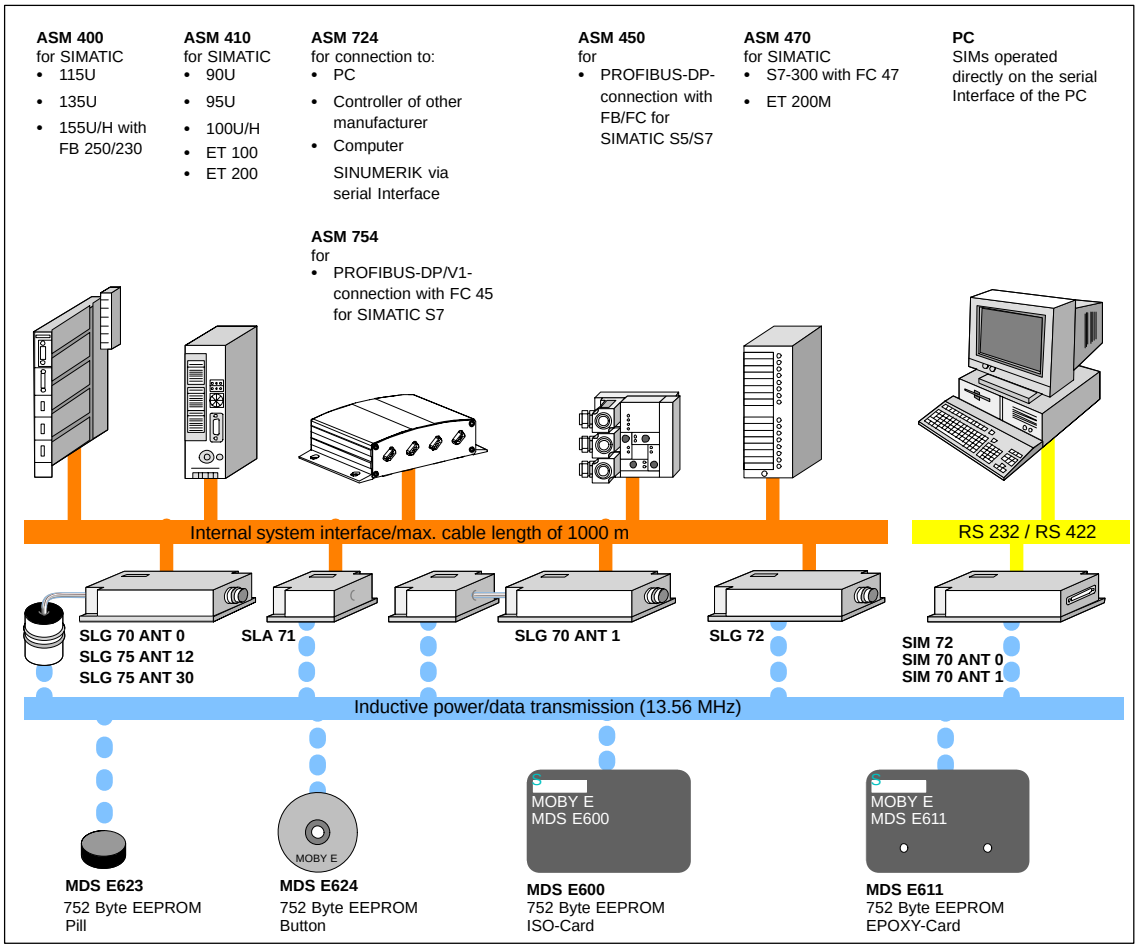


Figure 2-1 Overview of MOBY E components

Configuration and Mounting Guidelines 3

3.1 Basic Requirements

Warning

Do not make changes to the devices.
Violation will invalidate interference emission certification (BZT, FCC), CE and the manufacturer's warranty.

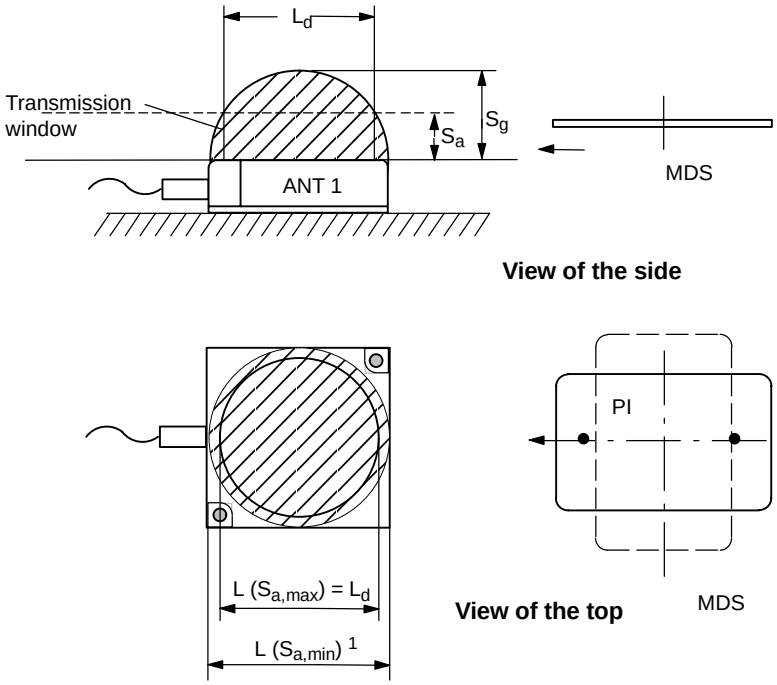
To choose the correct MOBY E components, apply the following criteria to your particular application.

- Transmission distance (i.e., read/write distance)
- The amount of data to be transferred
- Metal-free spaces for MDS and SLG/SLA
- Static of dynamic transmission of the data
- Speed for dynamic transmission
- Tolerances of the tracking
- Environmental conditions (e.g., moisture, temperature, chemical effects, and so on)
- Maximum write frequency per MDS

3.1.1 Transmission Window

The read/write device (i.e., SLG/SLA) generates an inductive alternating field. The field is strongest in the vicinity of the SLG/SLA and decreases in strength the further away from the SLG/SLA it moves. Distribution of the field depends on the layout and geometry of the antennas on the SLG/SLA and the MDS.

MDS functionality requires a minimum field strength on the MDS achieved at a distance of S_g from the SLG/SLA. The figure below shows the transmission window between the MDS and the SLG/SLA.



1 At $S_{a, min}$ the transmission window may increase.

S_a: Operating distance **(**between MDS and SLG/SLA**)**

S_g: Limit distance (The limit distance is the maximum clearance between the top of the SLG/SLA and the top of the MDS at which the transmission will still function under normal conditions.)

L: Length of a transmission window for vertical direction of movement of the MDS
The length L_d is valid for the calculation.
For $S_{a,min}$, the field length increases from L_d to L.

PI: Point of intersection of the symmetry axes of the MDS

Figure 3-1 Transmission window

The active field to the MDS is a circle. Cf. view of top.
The MDS can be processed as soon as the point of intersection (IP) of the MDS enters the circle of the transmission window.
If an MDS E600 or E611 enters the transmission field diagonally (hatched portion in figure 3-1), the length of the field is reduced by approx. 15 percent.

The above figure also shows that operation in the area between S_a and S_g is possible. The greater the distance, the smaller the active working area becomes until it is reduced to one point at distance S_g. For this reason, only static operation should be used in the area between S_a and S_g.

Direction of movement of the MDS

The MDS and the SLG/SLA do **not** have a polarization axis (i.e., the MDS can come from any direction, assume any position and cross the transmission window). The active area is shown below (i.e., for vertical, horizontal and diagonal operation).

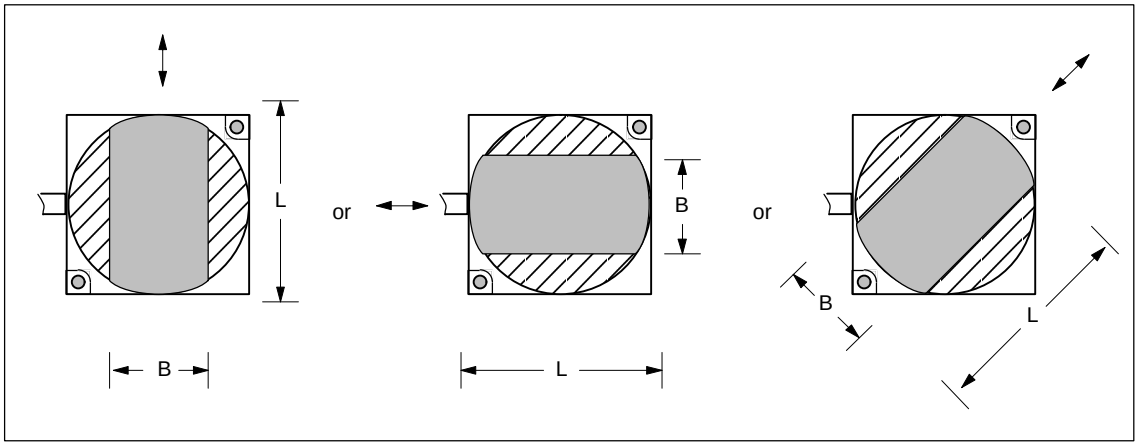


Figure 3-2 Direction of movement of the MDS

Working in static operation

When static operation is used, the MDS can be processed into the area of the limit distance (i.e., S_g). The MDS must be positioned exactly over the SLG/SLA as shown below.

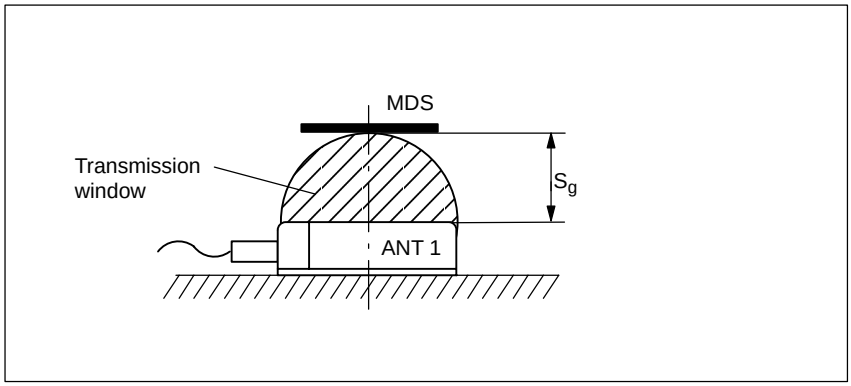


Figure 3-3 Working in static operation

Working in dynamic operation

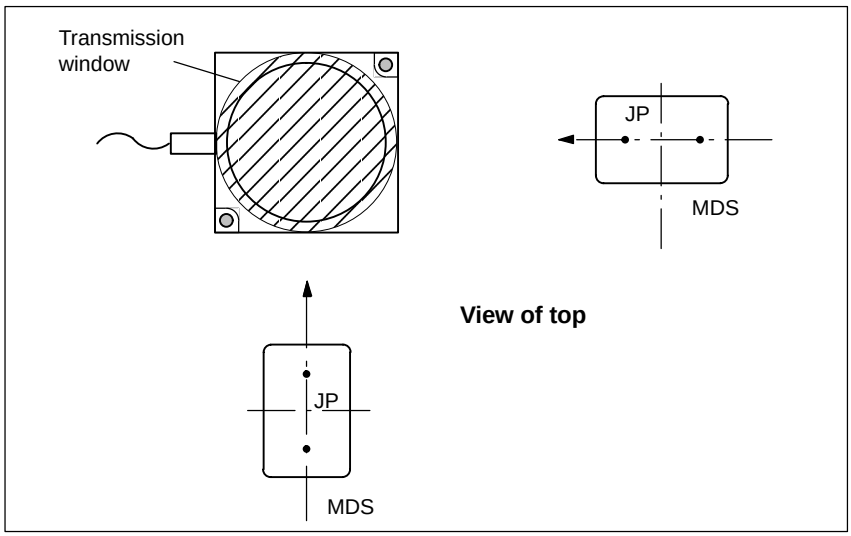


Figure 3-4 Working in dynamical operation

Width of the transmission window

The following approximation formula applies to practical applications:

$$B = 0.4 \cdot L$$

B: Width of the transmission window

L: Length of the transmission window

The width of the transmission window (B) is particularly important for the tolerance of mechanical tracking. When B is maintained, the formula can be used without restriction for the transmit period.

3.1.2 Transmit Period of the MDS

The transmit period is the time during which the MDS is located in the transmission window of an SLG/SLA. During this time, the SLG/SLA can exchange data with the MDS.

The formula used to calculate the transmit period is shown below.

$$T_V = \frac{L \cdot 0.8\,[m]}{V_{MDS}\,[m/s]}$$

$t_{V:}$ Transmit period of the MDS

L: Length of the transmission window

$V_{MDS:}$ Speed of the data memory in dynamic operation

0.8: Constant factor. Compensates for temperature influences and production tolerances.

During static operation, the transmit period can be any length of time. The transmit period must last at least as long as necessary to conclude communication with the MDS.

During dynamic operation, the transmit period is determined by the system environment. The amount of data to be transferred must be adjusted to the transmit period or vice versa.

General formula:

$$t_V \geq t_K$$

$t_{V:}$ Transmit period of the data memory in the field of the SLG/SLA

$t_{K:}$ Communication time between MDS and ASM

3.1.3 Communication between ASM, SLG/SLA and MDS

Communication between ASM, SLG/SLA and MDS is asynchronous with a transmission speed of 19200 baud.

General formula:

$$t_K = K + t_{Byte} \cdot n$$

Calculation of the maximum amount of user data:

$$n_{max} = \frac{t_V - K}{t_{Byte}}$$

t_K: Communication time between ASM, SLG/SLA and MDS

t_V: Transmit period

n: Amount of user data in bytes
To achieve optimal performance, “n” may not be set to more than 160.

n_{max}: Maximum amount of user data in bytes during dynamic operation

t_{byte}: Transmission time for 1 byte (cf. table 3-1)

K: Constant. The constant represents an internal system time. It contains the time required for power buildup on the MDS and the time required for command transmission (cf. table 3-1).

Table 3-1 Constant time K and t_{Byte}

K [msec]	t_{Byte} [msec]	Operating Mode
35	2,55	Read; normal operation
51	2,8	Write; normal operation

This table applies to all commands. When a user command consists of several subcommands, the formula for t_K must be applied to each subcommand.

The t_K calculation applies to interference-free transmission. When transmission is briefly interrupted due to external interference, the ASM continues the command automatically.

Table 3-2 Transmission time of ID number MDS E6xx

ID Number	Size of ID No.	Read ID No.
MDS E6xx	4 bytes	20 msec.

3.1.4 Communication between ASM and User Program

The time required for communication between ASM and user depends on the following factors.

- Cycle time, token rotation time and type of programmable controller
- Software used (FB 41, FB 47, FC 44, FC 45, FC 47, FB 240, FB 250)

Communication between the ASM 400 and the user can be divided into three steps.

a) The user issues a command and starts it. When the FB is called the next time, the command is transferred to the ASM and is acknowledged by the ASM.

b) The ASM executes the command with the MDS. The user or the FBs are in wait status. Data communication with the MDS starts as soon as an MDS enters the transmission window of the SLG/SLA. The MDS data are stored intermediately on the ASM and checked for correctness.

c) Communication of the ASM with the MDS has been concluded. When the FB is called the next time, the read data or the results of a write command are transferred from the ASM to the user. The user receives a finished message.

See applicable documentation for the exact communication times between ASM and user.

3.1.5 Sample Calculation

The customer application

A conveyor system moves the pallets with the MDS at a maximum speed of VMDS = 0.75 m/sec. The direction of movement is vertical. The following MOBY E components were selected.

- ASM 400 (with FB 250)
- SLG 70 ANT 1
- MDS E600

Task:

a) Physical specifications are to be provided to the constructor of the plant.

b) The maximum number of bytes in dynamic operation is to be provided to the programmer.

For technical data of the components, see the tables in chapter 3.2 (“field data of MDS, SLG and SLA”).

Tolerance of the height allowance of the pallet

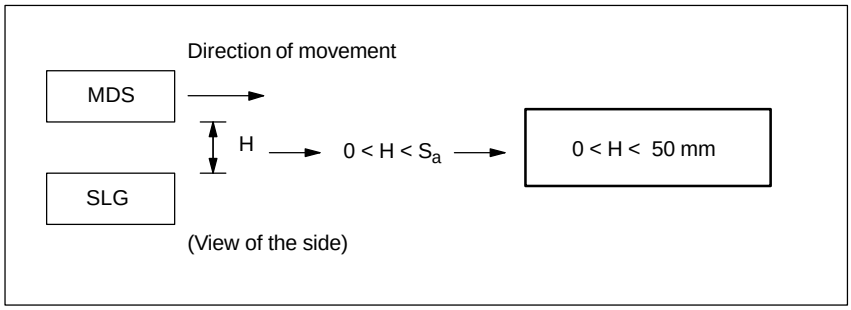


Figure 3-5 Tolerances of the side allowance of the pallet

Tolerances of the side allowance of the pallet

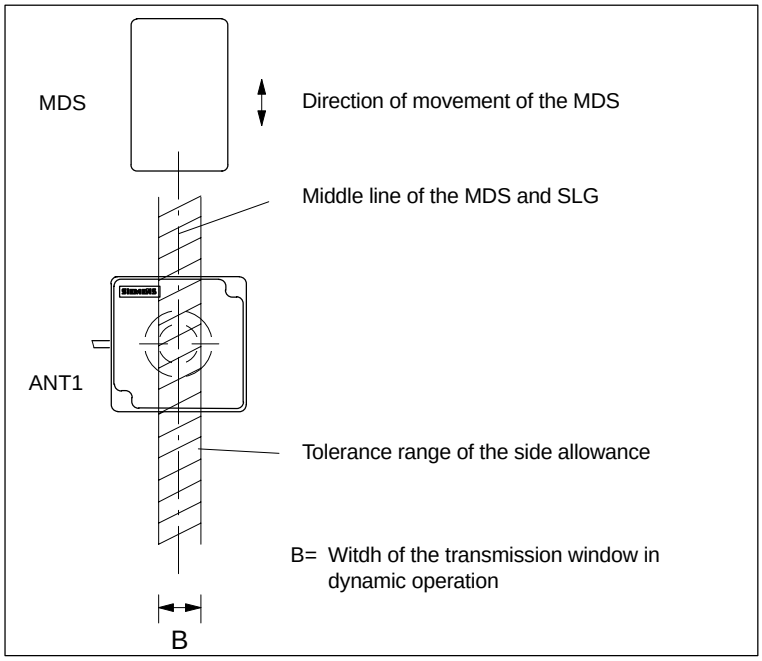

MDS
Direction of movement of the MDS
Middle line of the MDS and SLG
ANT1
Tolerance range of the side allowance
B= Witdh of the transmission window in dynamic operation
B

Figure 3-6 Tolerance of the side allowance of the pallet

Minimum distance between SLG/SLA and SLG/SLA

See table 3-5 for this value.

Minimum distance between MDS and MDS

See table 3-4 for this value.

Maximum number of bytes

$$t_v = \frac{L * 0.8}{V_{MDS}} = \frac{0.06\,m * 0.8}{0.75\,m/sec} = 0.064\ \text{sec} = 64\,msec$$

For normal operating mode, see table 3-1 for the values of K and t_{byte}.

Calculation of n_{max}

Read:
$$\frac{tv - K}{t_{Byte}} = \frac{64\,msec - 35\,msec}{2.55\,msec} = 11.37 \Rightarrow n_{\max} = 11\,bytes$$

Write:
$$\frac{tv - K}{t_{Byte}} = \frac{64\,msec - 51\,msec}{2.8\,msec} = 4.64 \Rightarrow n_{\max} = 4\,bytes$$

Up to 11 bytes can be read or 4 bytes can be written when the MDS passes by.

3.2 Field Data of MDS, SLG and SLA

The table below shows the field data of all MOBY E MDS, SLG and SLA components. This makes selecting an MDS and an SLG/SLA particularly easy.

The technical data represent average data and are valid for an ambient temperature of 0˚ to 50˚ C, a supply voltage of 22 V to 27 V DC, and metal-free surroundings. **Tolerances of ± 20% are permitted for production conditions and temperature fluctuations.**

Additional tolerances apply to the field data when the total voltage range from 20 V to 30 V DC is utilized for the SLG/SLA, and/or the entire temperature range is utilized for MDS and SLG/SLA.

Table 3-3 Field data of all MDSs, SLGs and SLAs without metal effects

MDS / SLG/SLA		MDS E600	MDS E611	MDS E623[3]	MDS E624
Length of the transmission window in mm (L)					
SLG 70 ANT 0	(L_d)	---	---	4	12
SLG 70 ANT 1	(L_d)	60[5]	80[5]	---	38
SLA 71	(L_d)	60[5]	80[5]	---	38
SLG 72	(L_x)[2] (L_y)[2]	75[5] 50[5]	90[5] 60[5]	---	60 40
SLG 75 ANT 12	(L_d)	---	---	8	---
SLG 75 ANT 30	(L_d)	---	---	---	14
Width of the transmission window in mm (W)					
SLG 70 ANT 0		---	---	2[4]	5 (12)[1]
SLG 70 ANT 1		24	32	---	15 (38)[1]
SLA 71		24	32	---	15 (38)[1]
SLG 72	(B_x)[2] (B_y)[2]	30 20	36 24	---	24 16
SLG 75 ANT 12		---	---	4	---
SLG 75 ANT 30		---	---	---	7
Working distance in mm (S_a)					
SLG 70 ANT 0		---	---	0 to 6	0 to 8
SLG 70 ANT 1		0 to 50	20 to 70	---	0 to 25
SLA 71		0 to 50	10 to 70	---	0 to 25
SLG 72		0 to 50	20 to 70	---	0 to 30
SLG 75 ANT 12		---	---	0 to 4	---
SLG 75 ANT 30		---	---	---	0 to 18

Table 3-3 Field data of all MDSs, SLGs and SLAs without metal effects

MDS / SLG/SLA	MDS E600	MDS E611	MDS E623[3]	MDS E624
Limit distance in mm (S_g)				
SLG 70 ANT 0	---	---	6	15
SLG 70 ANT 1	70	100	---	40
SLA 71	70	100	---	40
SLG 72	70	100	---	40
SLG 75 ANT 12	---	---	5	---
SLG 75 ANT 30	---	---	---	24

1 The width (W) contained in parentheses only applies to static MDS operation.
2 See also figure 5-14 for field geometry.
3 MDS E623 together with SLG 70 ANT 0 or SLG 75 ANT 12 only in static operation
4 A maximum average deviation of ±2 mm (without affecting the field data) is permitted in static operation.
5 Reduced by approx. 15% when the MDS enters the transmission window diagonally. See also figure 3-1.

Table 3-4 Minimum distance from MDS to MDS

	MDS E600	MDS E611	MDS E623	MDS E624
SLG 70 with ANT 0	---	---	> 30 mm	> 50 mm
SLG 70 with ANT 1	> 400 mm	> 400 mm	---	> 250 mm
SLA 71	> 400 mm	> 400 mm	---	> 250 mm
SLG 72	> 400 mm	> 400 mm	---	> 250 mm
SLG 75 ANT 12	---	---	> 20 mm	---
SLG 75 ANT 30	---	---	---	> 60 mm

Table 3-5 Minimum distance from SLG/SLA to SLG/SLA

	SLG 70 ANT 0	SLG 70 ANT 1	SLA 71	SLG 72	SLG 75 ANT 12	SLG 75 ANT 30
SLG 70 ANT 0	> 200 mm	> 400 mm	> 400 mm	> 400 mm	---	---
SLG 70 ANT 1	> 400 mm	> 800 mm	> 800 mm	> 800 mm	---	---
SLA 71	> 400 mm	> 800 mm	> 800 mm	> 800 mm	---	---
SLG 72	> 400 mm	> 800 mm	> 800 mm	> 800 mm	---	---
SLG 75 ANT 12	---	---	---	---	> 80 mm	---
SLG 75 ANT 30	---	---	---	---	---	> 125 mm

Note

Adherence to the values specified in table 3-5 is essential. There is a danger of the influence of inductive fields if the values are underranged. This would increase the time for data transmission incalculably or a command would be terminated with errors.

3.3 Presentation of Speed to Amount of Data

The curves shown here will simplify selection of MOBY E MDS and SLG components for dynamic operation. Information from the table in chapter 3.1.3 was used to calculate the curves. The curves apply to vertical operation with a single length of the transmission window (L_d).

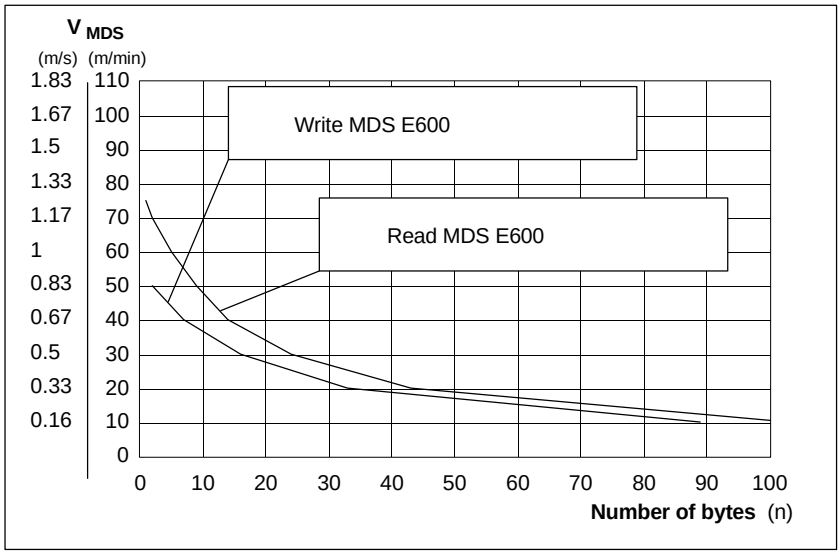


Figure 3-7 SLG 70 ANT 1/SLA 71 with MDS E600

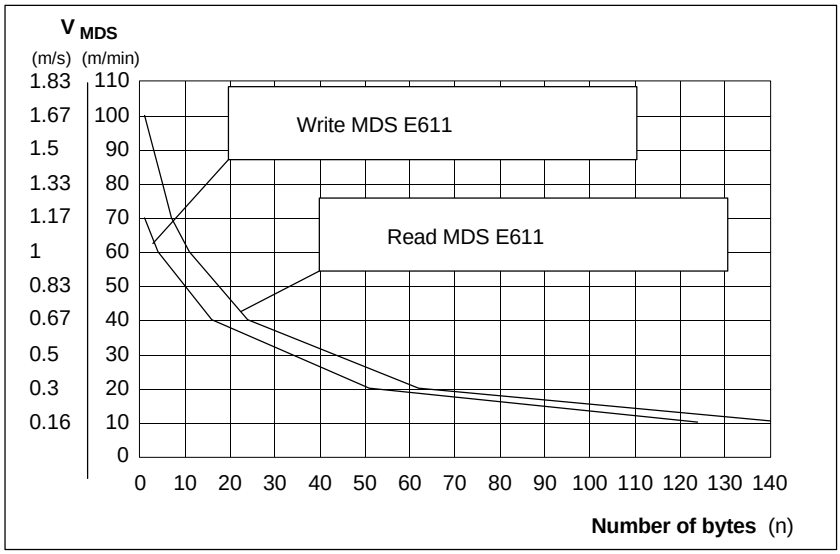


Figure 3-8 SLG 70 ANT 1/SLA 71 with MDS E611

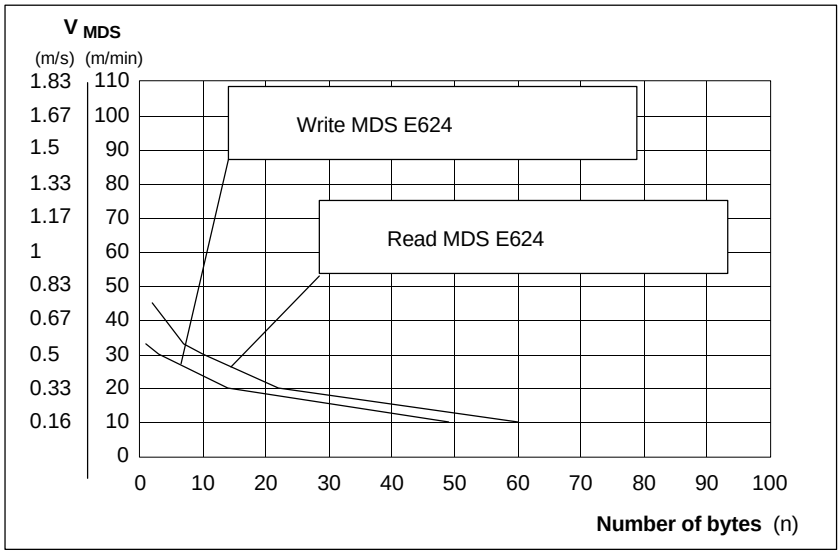


Figure 3-9 SLG 70 ANT 1/SLA 71 with MDS E624

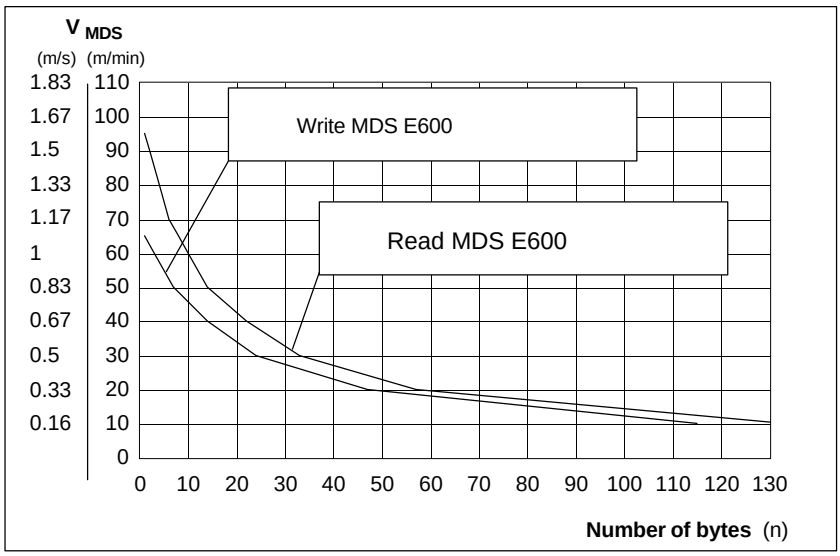


Figure 3-10 SLG 72 with MDS E600 (length L_x of the transmission window)

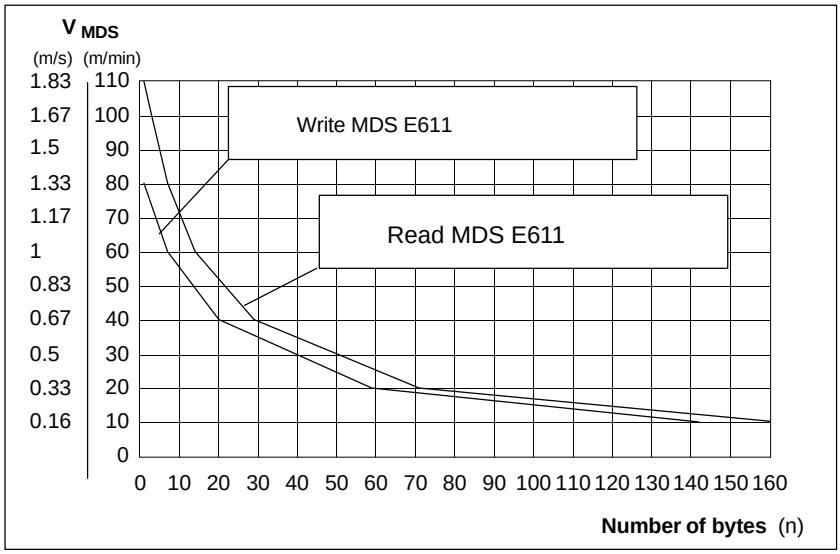


Figure 3-11 SLG 72 with MDS E611 (length L_x of the transmission window)

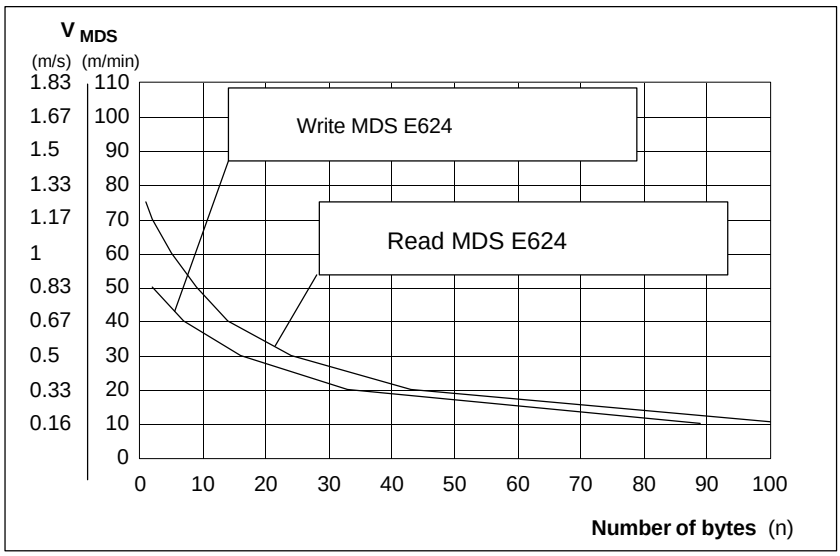


Figure 3-12 SLG 72 with MDS E624 (length L_x of the transmission window)

3.4 Installation Guidelines

The MDS, SLG and SLA are devices which work with induction. Every type of metal, particularly iron and ferromagnetic materials, in the vicinity of these devices influences their field geometry. To ensure that the field data described in chapter 3.2 retain their validity, several points must be adhered to when configuring and installing the devices.

- Minimum distance between two read/write devices or read/write antennas. (See table 3-5 and chapter 5.)
- Minimum distance between two adjacent data memories. (See table 3-4 and chapter 4.)
- Metal-free area with flush installation of SLG/SLA and MDS in metal
- Installation of several SLGs/SLAs in metal frames or carriers

The next few chapters describe how installation in metallic surroundings affects the identification system.

3.4.1 Definition of the Metal-Free Area

Metal-free space for MDS

Do not mount the MDS directly on metal (exception: MDS E623). Mounting the MDS directly on metal will interrupt all its functions. The following figures show the minimum distance of the MDS to metal.

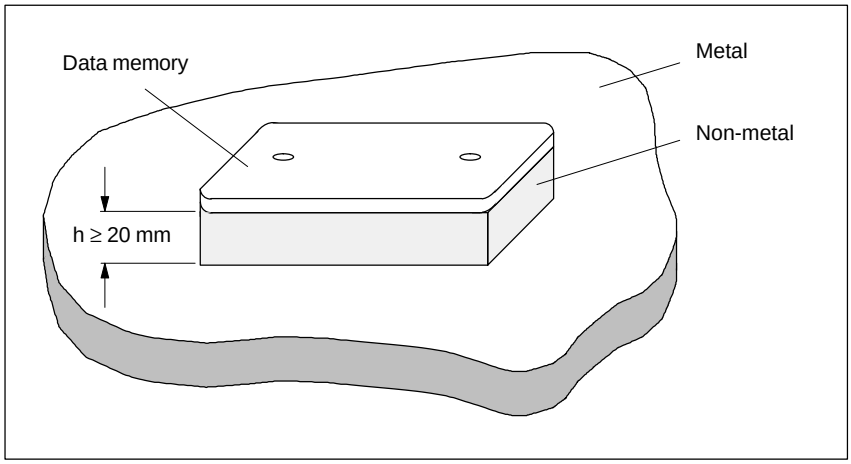


Figure 3-13 Mounting on metal: MDS E600/E611

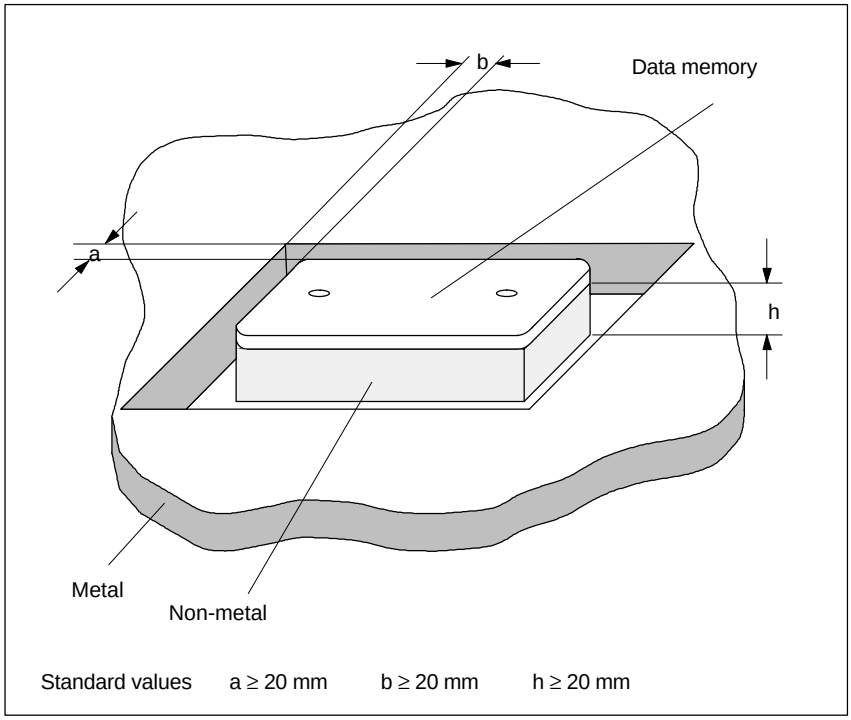


Figure 3-14 Flush mounting in metal: MDS E600/E611

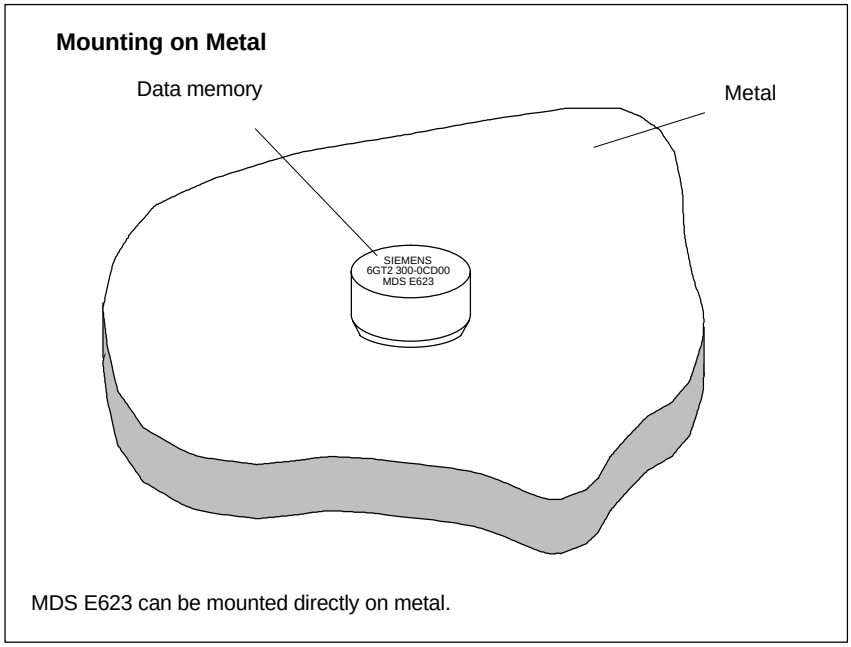


Figure 3-15 Mounting on metal: MDS E623

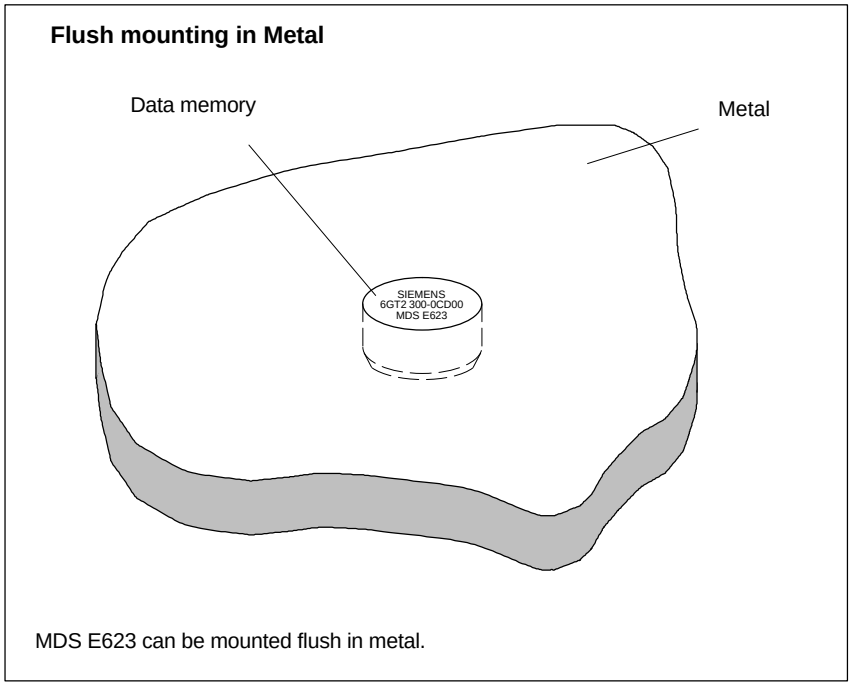


Figure 3-16 Metal-free space for MDS E623

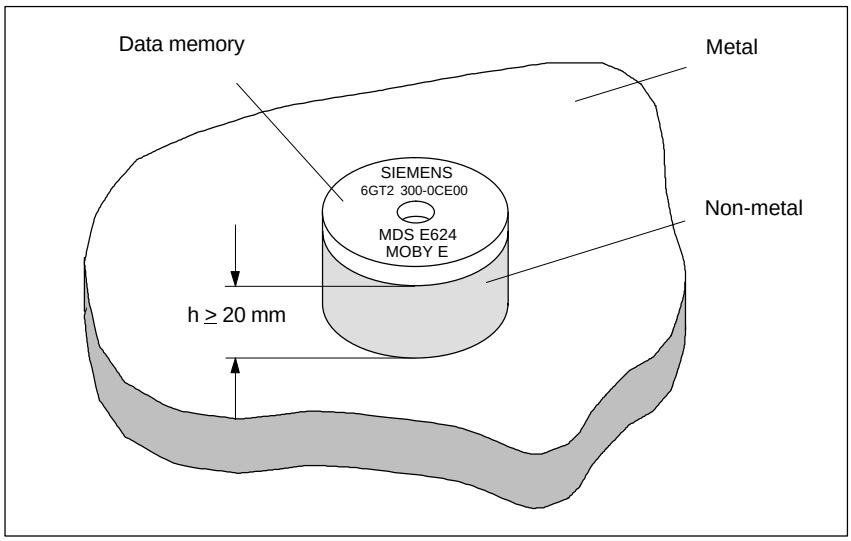


Figure 3-17 Mounting on metal: MDS E624

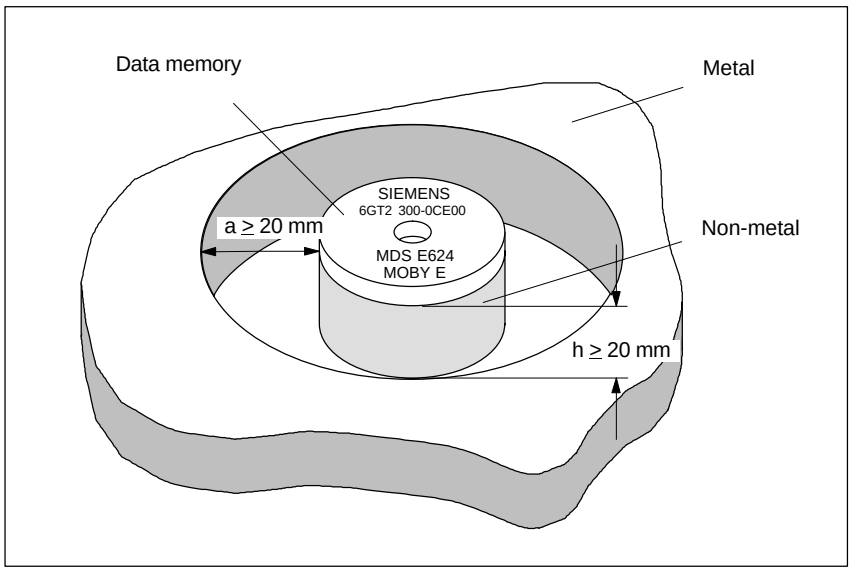


Figure 3-18 Flush mounting in metal: MDS E624

Underranging the standard values (i.e., a, b and h) will reduce the field data considerably. The MDS may be mounted with metal screws (i.e., M4 countersunk screws). This has no substantial effect on the range.

Metal-free space for SLG/SLA

When mounting the SLG/SLA, remember that metal in the vicinity of the antennas may affect the field data. Typical distances to metal are shown in the drawings below.

SLG 70 ANT 0

The cylinder-shaped ANT 0 antenna of the SLG 70 can be installed in metal with a minimum distance of 10 mm as shown in the following drawing. The field data are not affected.

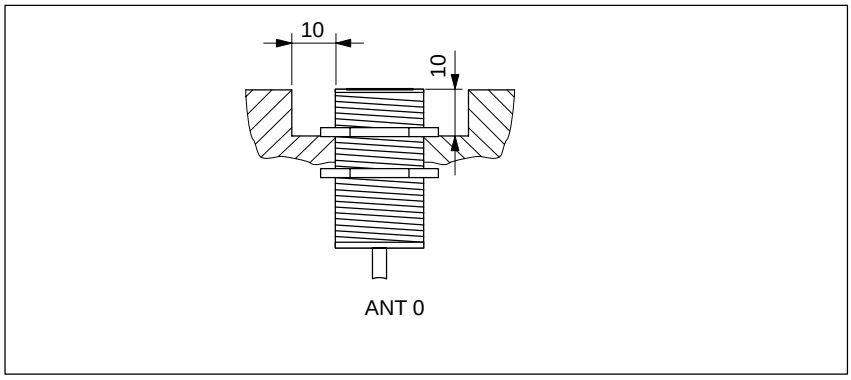


Figure 3-19 Flush installation in metal: SLG 70 ANT 0

SLG 70 ANT 1

The ANT 1 antenna can be mounted as shown in the following drawings. Remember that the field size may be reduced. See chapter 3.4.2.

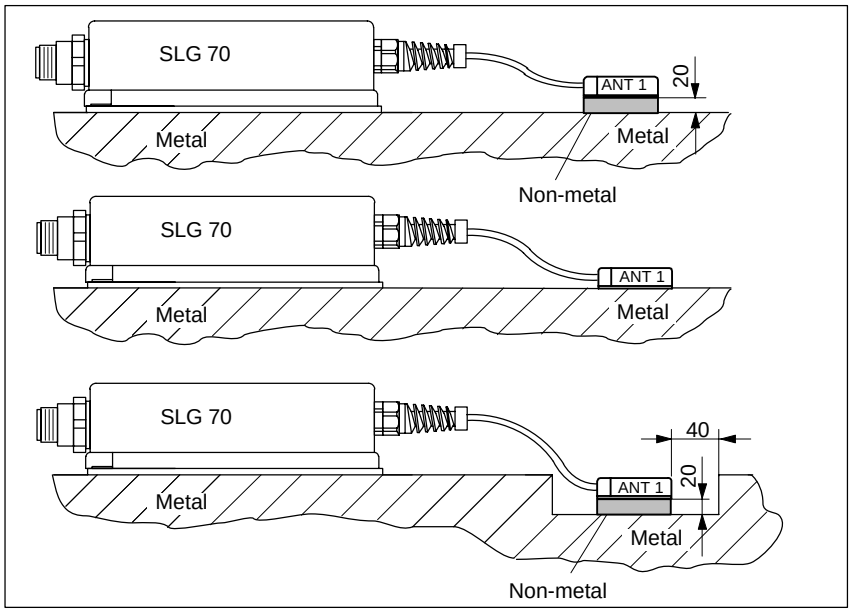


Figure 3-20 Mounting in metallic environment: SLG 70 ANT 1

SLG 72

Since the height of the housing of the SLG 72 with integrated antenna provides a sufficient distance to the metallic base, the device can be mounted directly on metal. When flush mounting is used, remember to maintain the specified distance to metal on the sides.

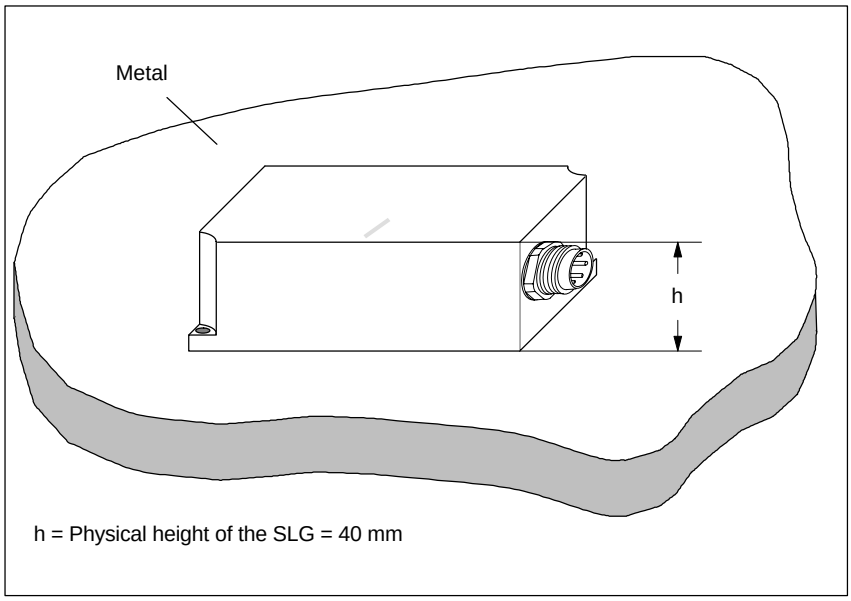


Figure 3-21 Mounting on metal: SLG 72

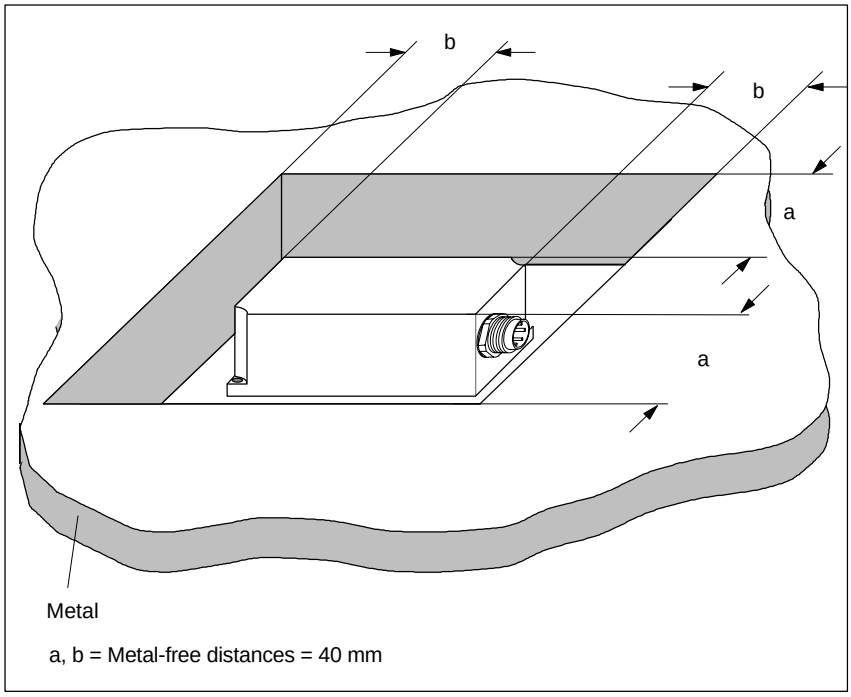


Figure 3-22 Flush installation in metal: SLG 72

SLG 75 ANT 12

With the SLG 75 with ANT 12, the antenna can be mounted flush in metal. This reduces the working and limit distance (see chap. 3.4.2).

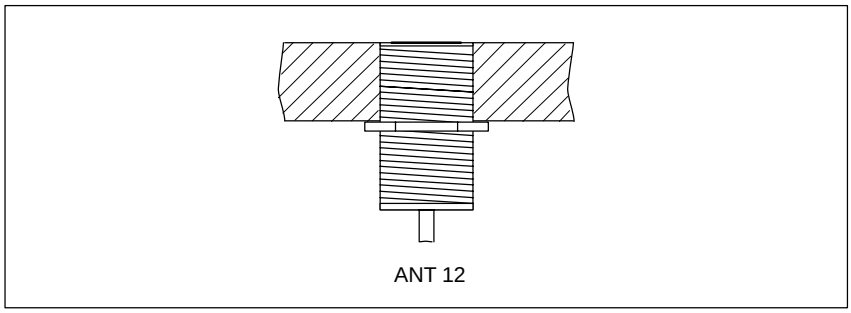


Figure 3-23 Flush mounting in metal: SLG 75 ANT 12

SLG 75 ANT 30

With the SLG 75 with ANT 30, the antenna can be mounted flush in metal. A distance of 20 mm must be maintained to the front of the antenna. This reduces the field data (see chap. 3.4.2).

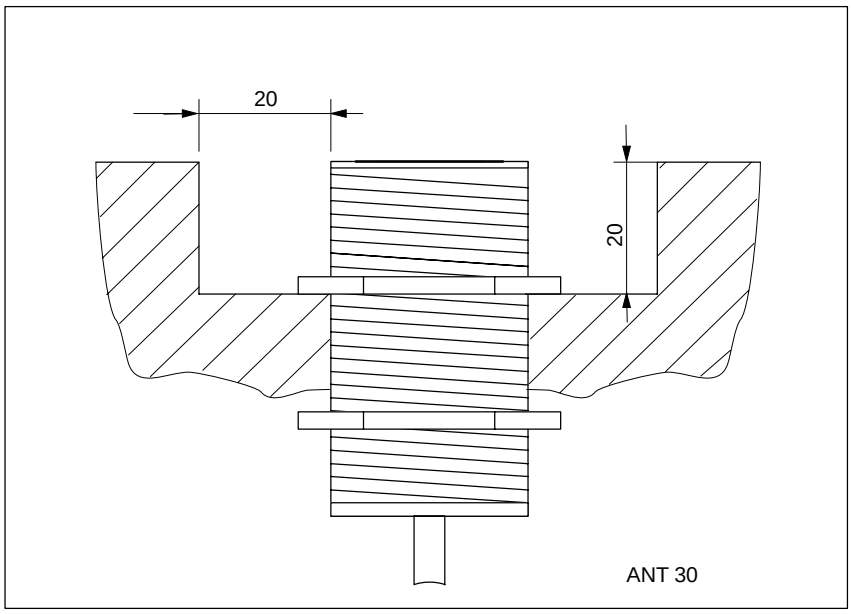


Figure 3-24 Flush mounting in metal: SLG 75 ANT 30

SLA 71

The SLA 71 can be mounted flush in metal. Remember that field data may be reduced (see chap. 3.4.2).

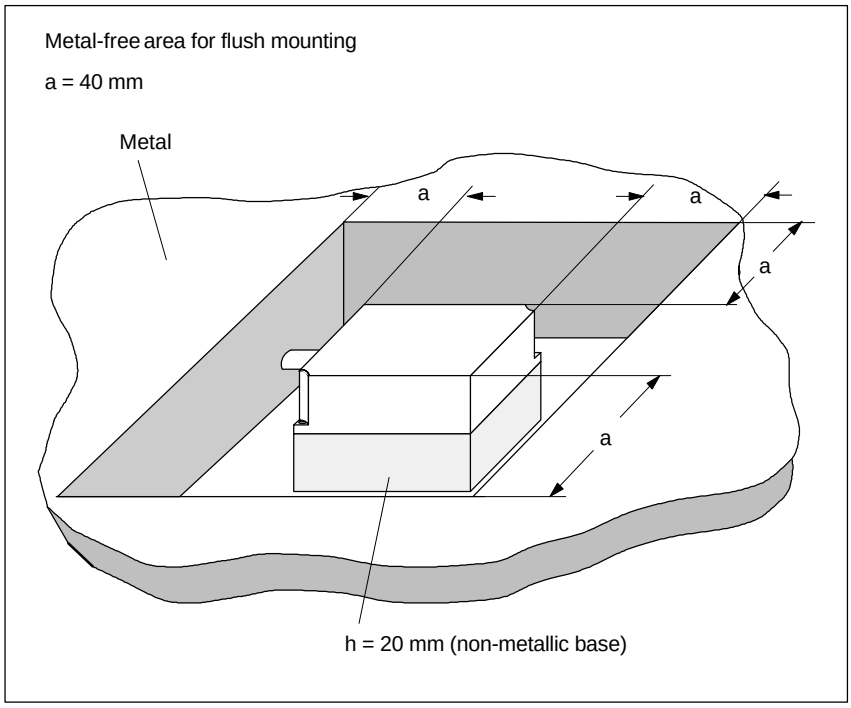


Figure 3-25 Flush mounting in metal: SLA 71

3.4.2 Effects of Metal on the Transmission Window

The following general points apply to the mounting of MOBY E components.

- The MDS may not be mounted directly on metal.
  (exception: MDS E623)
- Flush installation of the components in metal will reduce the field data. A test is recommended for critical applications.
- When processing in the transmission window, make sure that metal rails or similar do not cut through the transmission field since the metal rail would affect the field data.
- When the SLG 70 ANT 1 and SLG 72 are involved, the field remains virtually unaffected at distances to metal greater than 40 mm. When the SLG 70 ANT 0 is used, this distance is reduced to 10 mm.

Using tables and graphics, this chapter shows how the field data (i.e., S_g, S_a, L, and W) are affected by metal. The values in the tables represent the reduction of field data in % as related to non-metal (i.e., 100% stands for no effect).

MDS and SLG 70/SIM 70 with ANT 0 and SLG 75 with ANT 30

Table 3-6 Reduction in % of the field data by metal:
MDS with SLG 70 ANT 0 and SLG 75 with ANT 30

SLG 70 SIM 70 SLG 75 / **MDS**	No Metal [%]		Mounted Flush in Metal [%]	
	ANT 0	**ANT 30**	**ANT 0** Metal-free 10 mm circumfer-ence; 10 mm in depth	**ANT 30** Metal-free 20 mm circumfer-ence; 20 mm in depth
MDS E623				
MDS without metal	100	—	100	—
MDS on metal	80	—	80	—
MDS flush mounted in metal	60	—	60	—
MDS E624				
MDS without metal	100	100	100	80
MDS on metal Distance: 20 mm	100	90	100	75
MDS flush mounted in metal Distance: 20 mm/ circumference 20 mm	100	75	100	70

MDS and SLG 70/SIM 70 with ANT 1 and SLA 71

Table 3-7 Field data reduction by metal in %: MDS with SLG 70 ANT 1 and SLA 71

SLG 70 SIM 70 SLA 71 / MDS	ANT 1/SLA 71 without Metal [%]	ANT 1/SLA 71 on Metal Distance 20 mm [%]	ANT 1/SLA 71 Flush in Metal Distance of 20 mm Circumference 40 mm [%]	ANT 1/SLA 71 on Metal [%]
MDS E600				
MDS without metal	100	100	80	70
MDS on metal Distance 20 mm	80	70	60	50
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	50	40
MDS E611				
MDS without metal	100	100	80	70
MDS on metall Distance 20 mm	75	75	55	45
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	70	50	40
MDS E624				
MDS without metal	100	100	80	60
MDS on metal Distance 20 mm	100	100	80	60
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	80	60	60	40

MDS and SLG 75 with ANT 12

Table 3-8 Field data reduced by metal in %: MDS and SLG 75 with ANT 12

SLG 75 / MDS	ANT 12 without Metal [%]	ANT 12 Flush in Metal Distance 10 mm Circumference 10 mm [%]	ANT 12 Flush Mounted in Metal [%]
MDS E623			
MDS without metal	100	85	85
MDS with metal Distance 20 mm	100	85	85
MDS flush mounted in metal Distance 20 mm/circumference 20 mm	75	75	60

MDS and SLG 72/SIM 72

Table 3-9 Field data reduction by metal in %: MDS with SLG 72

SLG/SIM 72 / MDS	Without Metal [%]	On Metal [%]	Flush in Metal Circumference 40 mm [%]
MDS E600			
MDS without metal	100	100	100
MDS on metal Distance 20 mm	80	70	70
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	60
MDS E611			
MDS without metal	100	100	80
MDS on metal Diatance 20 mm	80	70	70
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	60
MDS E624			
MDS without metal	100	100	80
MDS on metal Distance 20 mm	100	80	80
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	60	40	40

Below are figures using the SLG 70 ANT 1 with MDS E611 as an example to illustrate how metal affects the transmission window.

The percentages apply to field data reduction in relation to a metal-free environment (i.e., 100%).

MDS in metal-free environment

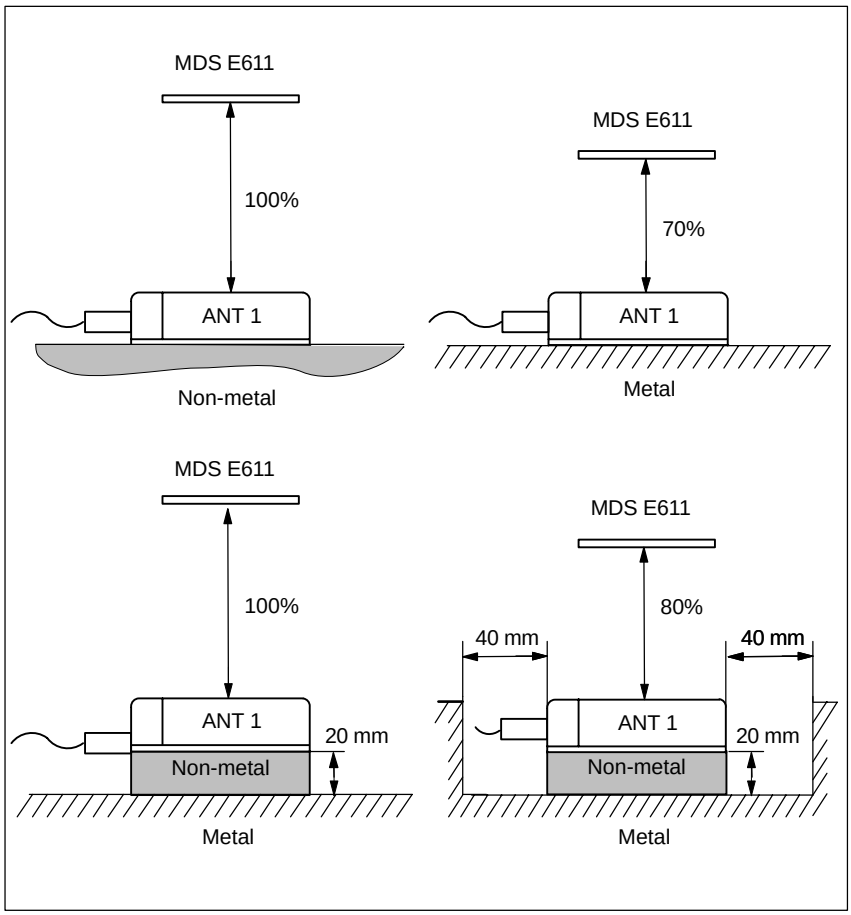


Figure 3-26 MDS in metal-free environment (example: MDS E611)

MDS in metallic environment

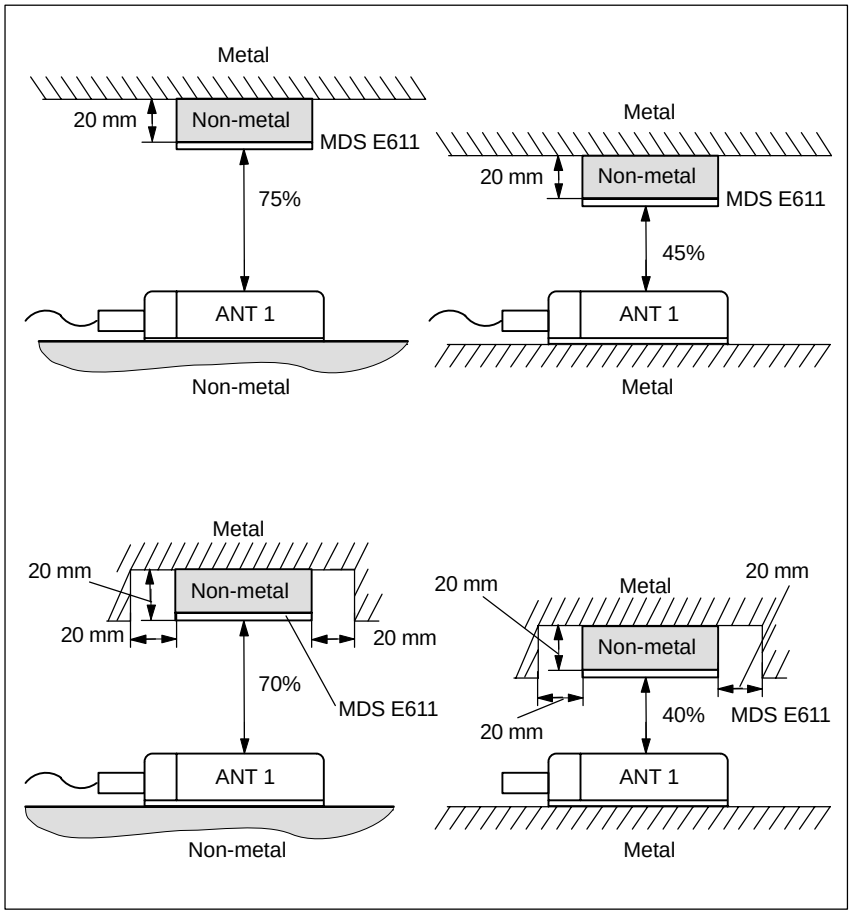


Figure 3-27 The MDS in a metallic environment (example: MDS E611)

3.4.3 Reduction of Metallic Effects

Interfering metal carriers

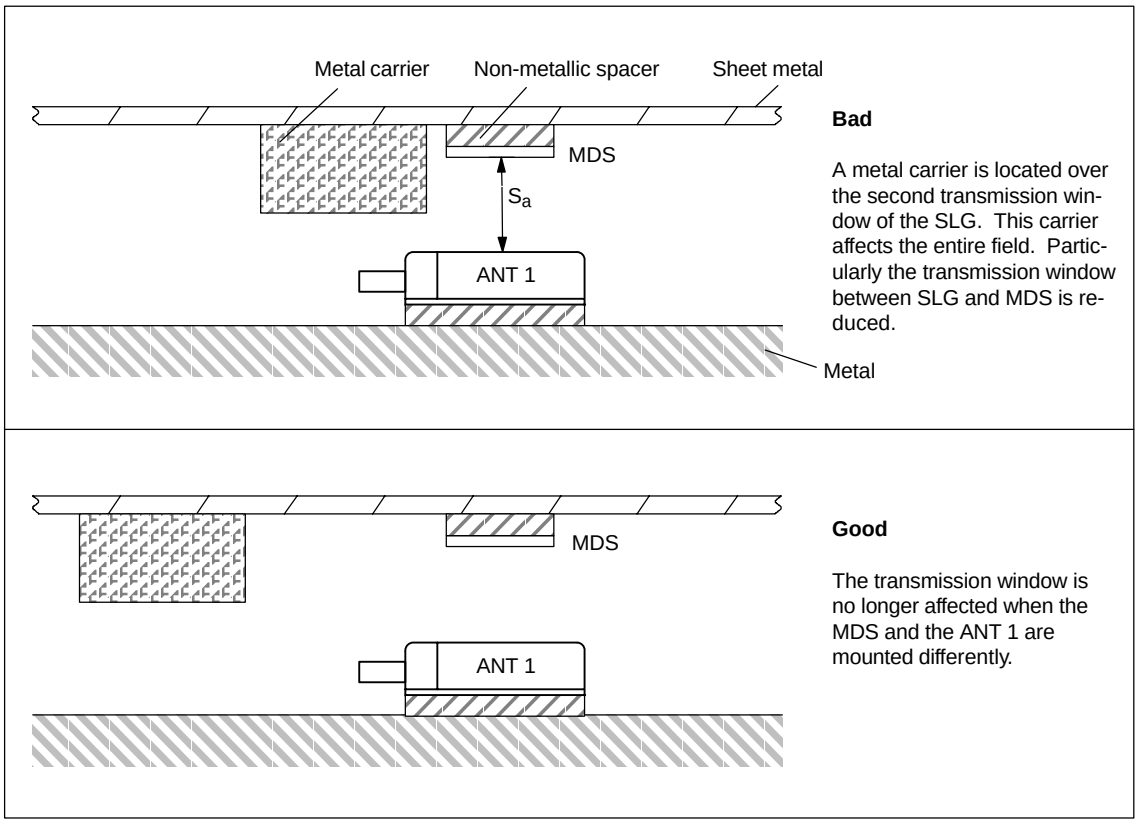
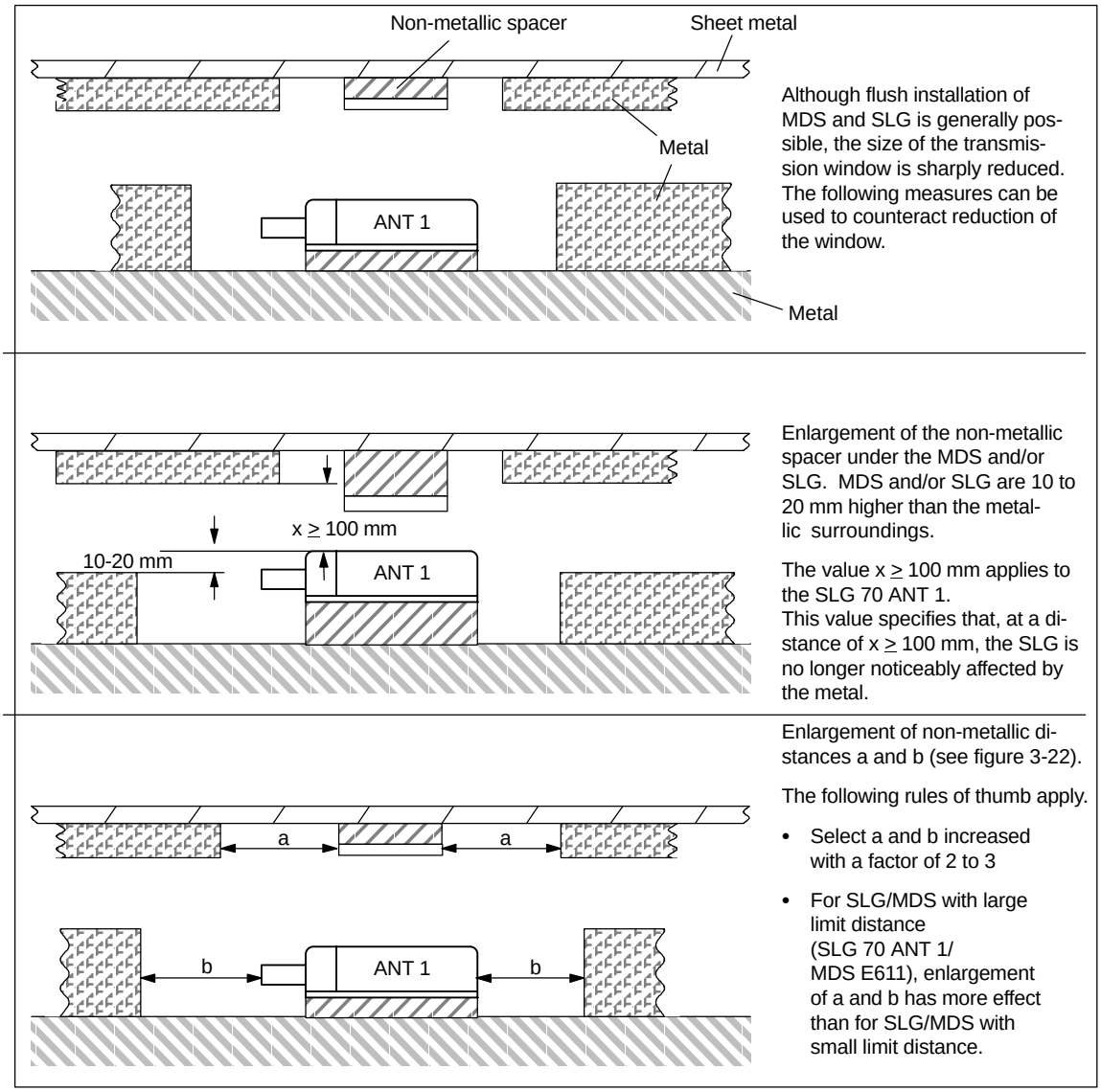

Metal carrier
Non-metallic spacer
Sheet metal
MDS
S_a
ANT 1
Metal
Bad
A metal carrier is located over the second transmission window of the SLG. This carrier affects the entire field. Particularly the transmission window between SLG and MDS is reduced.
MDS
ANT 1
Good
The transmission window is no longer affected when the MDS and the ANT 1 are mounted differently.

Figure 3-28 Interfering metal carriers

Flush installation



Although flush installation of MDS and SLG is generally possible, the size of the transmission window is sharply reduced. The following measures can be used to counteract reduction of the window.

Enlargement of the non-metallic spacer under the MDS and/or SLG. MDS and/or SLG are 10 to 20 mm higher than the metallic surroundings.

The value x ≥ 100 mm applies to the SLG 70 ANT 1.
This value specifies that, at a distance of x ≥ 100 mm, the SLG is no longer noticeably affected by the metal.

Enlargement of non-metallic distances a and b (see figure 3-22).

The following rules of thumb apply.

- Select a and b increased with a factor of 2 to 3
- For SLG/MDS with large limit distance (SLG 70 ANT 1/ MDS E611), enlargement of a and b has more effect than for SLG/MDS with small limit distance.

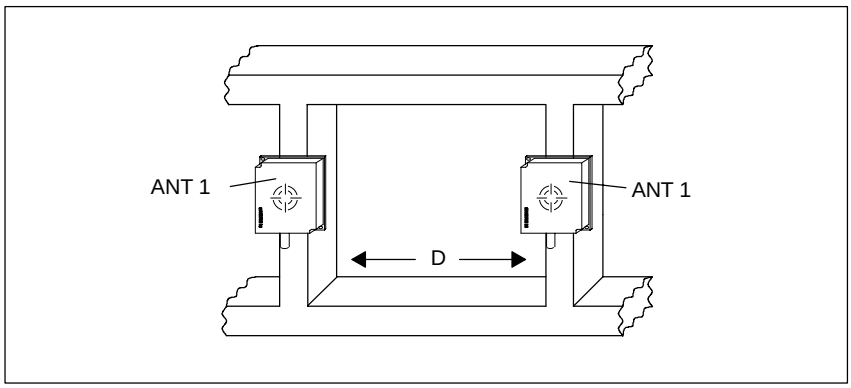
Figure 3-29 Flush installation

Installation of several SLGs/SLAs on metal frame or carrier

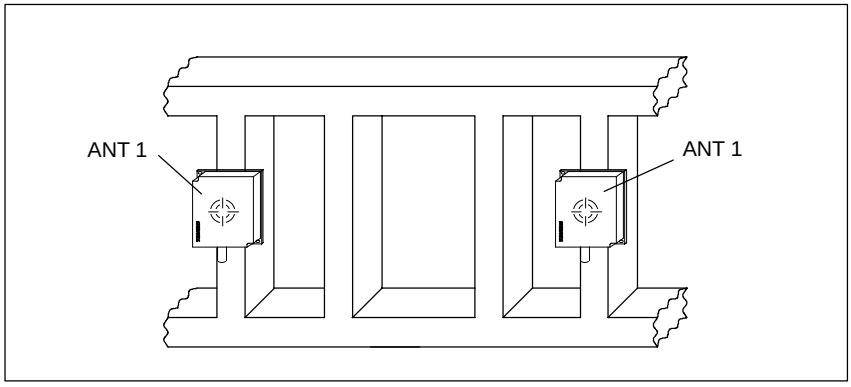
Every SLG/SLA which is mounted on metal couples part of the field on the metal carrier. When minimum distance D is maintaining and metal-free areas a and b are adhered to, there are usually no effects. However, when the location of an iron frame is particularly poor, there may be some effects. This will lengthen data transmission times or cause sporadic error messages on the interface.

Necessary actions

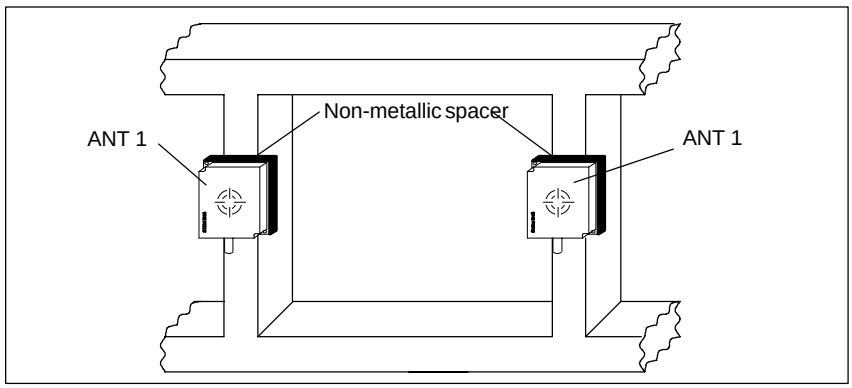
a) Lengthen distance D between the two ANT 1s



b) Install one or more iron struts to short circuit the parasitic fields



c) Install a non-metallic spacer of 20 to 40 mm in thickness between the ANT 1 and the iron frame. This significantly reduces parasitic coupling of the field on the carrier.



3.4.4 Chemical Resistance of the Mobile Data Memories

MDS E600

The MDS E600 is resistant to the substances listed in the following table.

Table 3-10 Chemical resistance of the MDS E600

Substance	Concentration
Salt water	5%
Sugar water	10%
Acetic acid, hydrous solution	5%
Sodium carbonate, hydrous solution	5%
Ethyl alcohol, hydrous solution	60%
Ethylenglycol	50%
Fuel, B	In acc. w. ISO 1817
Human perspiration	

Reference: ISO 10373/ISO 7810

MDS E611/ E623/E624

Table 3-11 Chemical resistance of data memories made of fiber glass reinforced epoxy resin (MDS E611/E623/E624)

	Concentration	20° C	40° C	60° C
Allyl choride		■		
Formic acid	50%	■		
	100%	●		
Ammonia, gaseous		■		
Ammonia, liquid, anhydrous		□		
Ammonium hydroxide	10%	■		
Ethanol			■	■
Ethyl acrylate		■		
Ethylene glycol				■
Gasoline, free of aromatic compounds		■		
Gasoline, unstripped		■		
Bezoates (Na-, Ca- and similar)			■	
Bezoic acid		■		
Benzine		■		
Benzene-sulfonic acid		■		
Benzyl chloride		□		
Borax				■
Boric acid		■		
Bromine, liquid		□		
Bromine, gaseous, dry		□		
Bromide (K-, Na- and similar)				■
Bromoforme	100%	■		
Bromide water		□		
Butadiene (1, 3-)		■		
Butane, gaseous		■		
Butanol		□		
Butyric acid	100%	●		
Carbonates (ammonia-, Na- and sim.)				■
Chlorine, liquid		□		
Chlorine, gaseous, dry	100%	□		
Chlorobenzene		■		
Chloride (ammonia-, Na- and similar)				■
Chloroform		□		
Chlorophyll		■		
Chlorosulphonic acid	100%	□		
Chlorine water (saturated solution)		●		
Chromates (K-, Na- and similar)	Up to 50%		■	
Chromic acid	Up to 30%	□		
Chromic sulfuric acid		□		
“Lemon acid”		■		
Cyanamide		■		
Cyanides (K-, Na- and similar)				■
Dextrine (hydrous solution)				■
Diethyl ether		■		
Diethylene glycol				■
Dimethyl ether		■		
Dioxan		□		
Developer			■	
Acetic acid	100%	●		
Fixing bath			■	
Fluorides (ammonia-, K-, Na- and sim.)			■	
Hydrofluoric acid	Up to 40%	■		
Formaldehyde	50%	■		
Formamide	100%	■		

Table 3-11 Chemical resistance of data memories made of fiber glass reinforced epoxy resin (MDS E611/E623/E624)

	Concentration	20° C	40° C	60° C
Gluconic acid		■		
Glycerin				■
Glycocoll				■
Urine		■		
Uric acid		■		
Hydroxides (ammonia-)	10%	■		
Hydroxides (Na- and K-)	40%	■		
Hydroxides (alkaline earth metal-)				■
Hypochlorites (K-, Na- and similar)				■
Iodides (K-, Na- and similar)				■
Silicic acid				■
Cresylol	Up to 90%	□		
Methanol	100%		■	
Methylene chloride		□		
Lactic acid	100%	●		
Mineral oils			■	
Nitrates (ammonia-, K- and similar)				■
Nitroglycerin		□		
Oxalic acid		■		
Phenol	1%	■		
Phosphates (ammonia-, Na- and similar)				■
Phosphoric acid	50%			■
	85%	■		
Propyl alcohol		■		
Nitric acid	25%	□		
Hydrochloric acid	10%	□		
Brine				□
Sulfur dioxide	100%	●		
Carbon bisulphide, 100%		□		
Sulphuric acid	40%	□		
Sulphurous acid		●		
Soap solution				■
Sulfates (ammonia-, Na- and similar)				■
Sulfites (ammonia-, Na- and similar)				□
Tar, free of aromatic compounds				■
Turpentine		■		
Trichlorethlylene		□		
Hydrogen peroxide	30%	■		
Tartaric acid		■		

Explanation of the symbols

■ Resistant
● Somewhat resistant
□ Not resistant

3.5 EMC Guidelines

3.5.1 Foreword

The EMC guidelines contain the following information.

- Why are the EMC guidelines necessary?
- What interference affects the controller from the outside?
- How can interference be prevented?
- How can interference be corrected?
- Which standards apply to the EMC guidelines?
- Examples of an interference-suppressed system setup

The description is directed to “qualified personnel.”

- Configuration engineers and planners who plan system configuration with the MOBY modules and who must adhere to the required guidelines
- Skilled personnel and service engineers who install the connection cables based on this description or who can correct deficiencies in this area when a malfunction occurs.

Warning

Non-adherence to especially highlighted notes can cause dangerous states in the system or destroy either single components or the entire system.

3.5.2 General

The continuously growing use of electrical and electronic devices brings with it the following characteristics.

- Greater concentration of components
- Increasing capacity of power electronics
- Rising switching speeds
- Lower current consumption of the components

The higher the degree of automation, the greater the danger that devices will interfere with one another.

- Electromagnetic compatibility (i.e., EMC) is the ability of a piece of electrical or electronic equipment to function correctly in an electromagnetic environment without interfering with or adversely affecting its surroundings within certain limits.

EMC can be divided into three areas.

- Intrinsic interference immunity
  Resistance to internal (i.e., own) electrical interference
- Free interference immunity
  Resistance to external electromagnetic interference
- Degree of interference emission
  Interference emission and effects of the electrical environment

All three areas are included in the test of an electrical device.

The MOBY modules are tested for adherence to the limit values contained in the CE and BAPT guidelines. Since MOBY modules are only one of many components in a total system and the combination of various components may also create sources of interference, certain guidelines must be adhered to when setting up a system.

EMC measures usually consist of an entire package of measures all of which must be taken in order to obtain an interference-immune system.

Note

- The system provider is responsible for adherence to the EMC guidelines, while the user is responsible for the interference suppression of the complete system.
- All measures taken while the system is being set up will eliminate the need for expensive modifications and removal of interference sources later.
- Although the regulations of specific countries must also be adhered to, this information is not covered in the documentation.

3.5.3 Spreading of Interference

Three components are required so that interference can affect a system.

- Source of interference
- Coupling path
- Potentially susceptible equipment

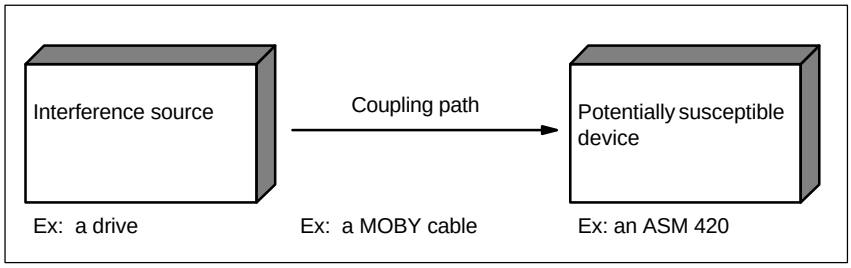


Figure 3-30 Spreading of interference

If one of these components is missing (e.g., the coupling path between the source of the interference and the potentially susceptible device), the susceptible device will not be affected even when strong interference is being emitted.

The EMC measures affect all three components to prevent any malfunctions caused by interference. When a system is set up, the provider must take all possible measure to prevent the creation of sources of interference.

- Only equipment which meets limit value class A of VDE 0871 may be used in a system.
- All interference caused by devices must be suppressed. This includes all coils and windings.
- The layout of the cabinet must be such that reciprocal interference of the individual components is avoided or kept as low as possible.
- Measures must be taken to eliminate interference from external sources.

The next few chapters provide information and tips on how to set up a system.

Sources of interference

It is necessary to be familiar with the most frequent sources of interference in order to achieve a high degree of electromagnetic compatibility (i.e., a very low degree of interference in the environment) in a system. These sources of interference must be eliminated by taking appropriate measures.

Table 3-12 Interference sources: Origin and effects

Interference Source	Interference Origin	Effect on Potentially Susceptible Equipment
Contactor, electronic valves	Contacts	Power network malfunctions
	Coils	Magnetic field
Electric motor	Collector	Electrical field
	Winding	Magnetic field
Electric welding device	Contacts	Electrical field
	Transformer	Magnetic field, power network malfunction, equalizing currents
Power pack, switched-mode	Circuit	Electrical and magnetic field, power network malfunction
High-frequency devices	Circuit	Electromagnetic field
Sender (e.g., industrial radios)	Antenna	Electromagnetic field
Difference in grounding or reference potential	Voltage difference	Equalizing currents
Operator	Static charging	Electrical discharging currents, electrical field
High-voltage current cable	Current flow	Electrical and magnetic field, power network malfunction
High-voltage cable	Voltage difference	Electrical field

Coupling paths

A coupling path is required before interference generated by the source can take effect. There are four kinds of interference coupling.

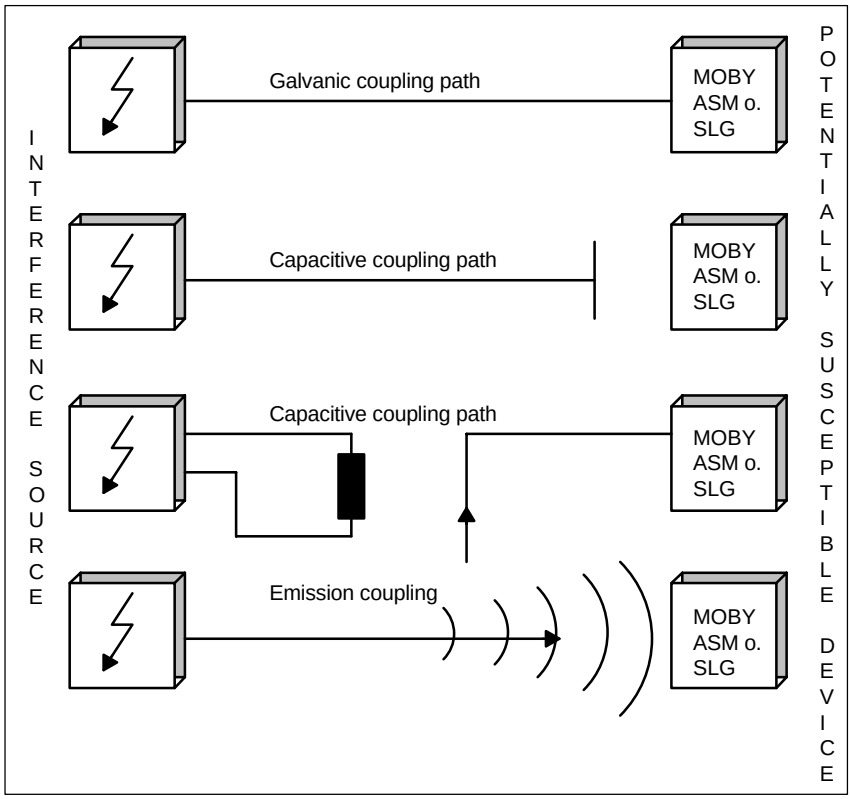


Figure 3-31 The four kinds of interference coupling

When MOBY modules are used, various components of the total system can act as coupling paths.

Table 3-13 Causes of coupling paths

Coupling Path	Cause
Cables and lines	Incorrect or unfavorable installation
	Missing or incorrectly connected shields
	Cables spaced unfavorably
Switching cabinet or SIMATIC housing	Missing or incorrectly wired equalizing line
	Missing or incorrect grounding
	Cables spaced unfavorably
	Modules not installed securely
	Poor cabinet layout

3.5.4 Cabinet Layout

User influence on the configuration of an interference-immune system includes the cabinet layout, cable installation, grounding connections and correct shielding of lines.

Note

For notes on correct cabinet layout in accordance with EMC guidelines, see the layout guidelines of the SIMATIC controller.

Shielding via housing

Metal housings for potentially susceptible equipment can be used to keep out magnetic and electrical fields and electromagnetic waves. The better the induced interference current can flow, the greater the spontaneous weakening of the field of interference. All sheet metal on the housings or sheet metal in the cabinet must be well connected together (i.e., with a high degree of conductivity).

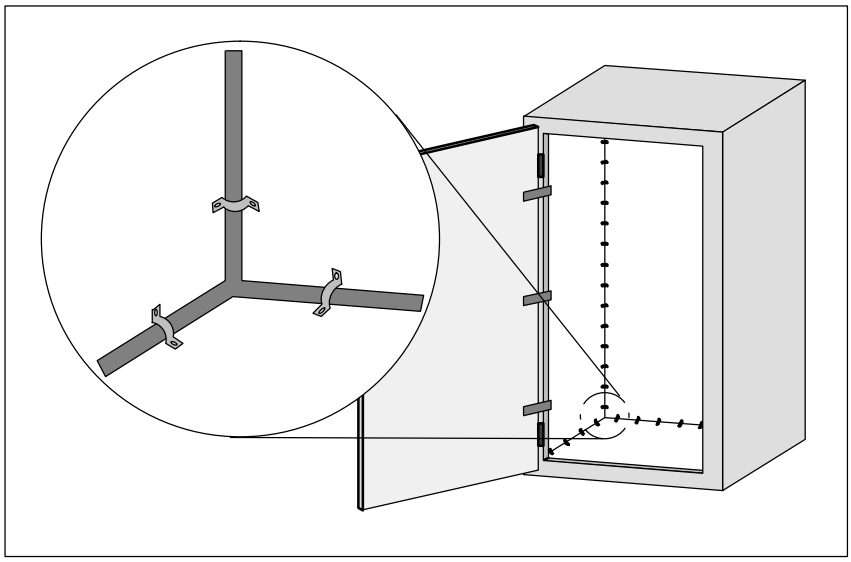


Figure 3-32 Shielding via housing

When the sheet metal parts of switching cabinets are insulated against each other, a high-frequency conductive connection with the ribbon cables and high-frequency terminals or HF conductive paste can be created. The greater the connection surface, the better the high-frequency conductive capacity. This cannot be achieved by connection with simple wires.

Avoiding interference via optimal layout

Good interference diversion is achieved by installing SIMATIC controllers on conductive mounting plates (unpainted). When setting up the switching cabinet, interference can be easily avoided by adhering to guidelines. Power components (e.g., transformers, drives and load power supplies) should be installed separately (i.e., separated by space) from the controller components (e.g., relay controllers and SIMATIC S5).

The following basic principles apply.

1. The effect of interference decreases the greater the distance between interference source and potentially susceptible equipment.
2. Interference is further reduced by installing shielding plates.
3. Load lines and high-voltage current cables must be installed separately from the signal lines at a distance of at least 10 cm.

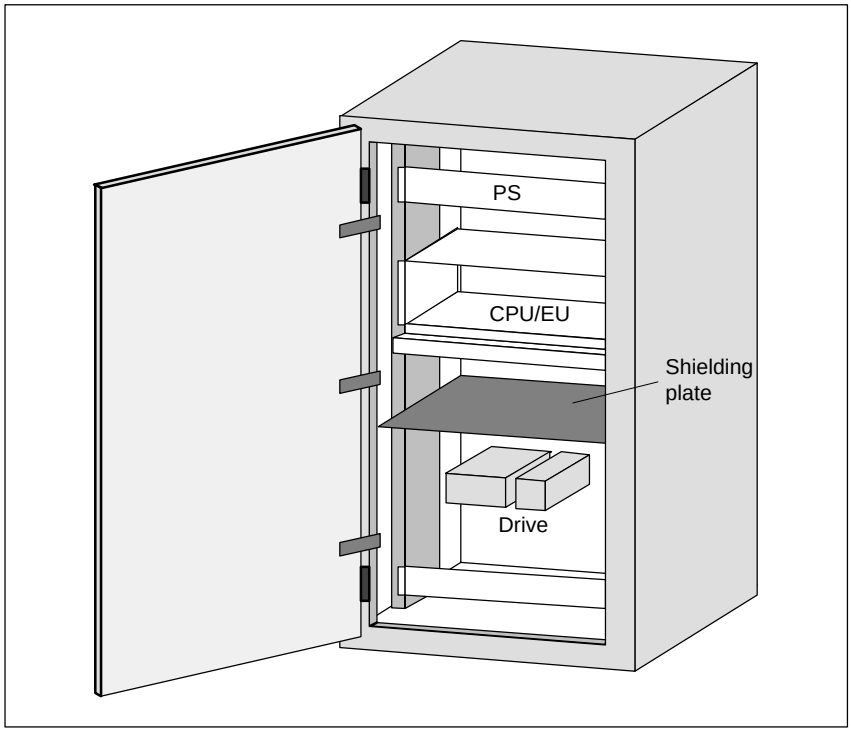


Figure 3-33 Avoidance of interference via optimal layout

Filtering the supply voltage

External interference from the power network can be avoided by installing power network filters. In addition to correct dimensioning, proper installation is very important. It is imperative that the power network filter be installed directly at the entrance to the cabinet. Interference currents are filtered out early at the entrance and not conducted through the cabinet.

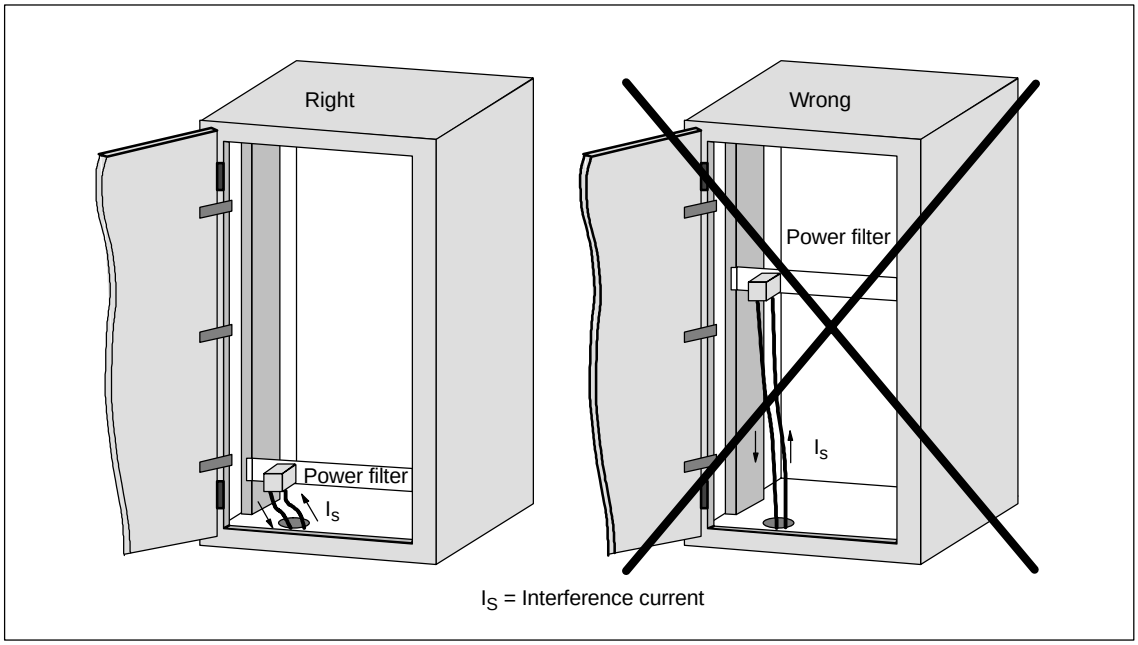


Figure 3-34 Filtering the supply voltage

3.5.5 Avoiding Interference Sources

Sources of interference in a system must be avoided so that a higher degree of interference immunity can be achieved. All circuited inductivities are a frequent cause of interference in a system.

Interference suppression of inductivities

Since relays, contactors and so on generate interference voltages, this interference must be suppressed with one of the following circuits.

When the coil is switched, up to 800 V can be created on 24 V coils even with small relays. Several kV can be created on 220 V coils. By using freewheeling diodes or RC circuitry, the interference voltage is prevented and, with it, the inductive interference in the lines parallel to the coil lines.

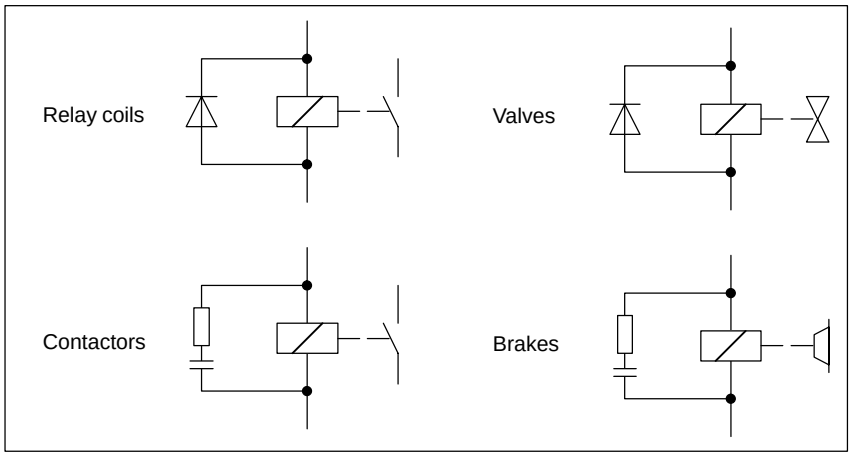


Figure 3-35 Inductive interference

Note

All coils in the cabinet must be interference-suppressed. Valves and motor brakes are frequently forgotten. Fluorescent lamps in the switching cabinet must be subjected to a special test.

3.5.6 Equipotential Bonding

Differing system part layouts and differing voltage levels can cause differences in potential between the parts of a system. When the system parts are connected via signal lines, equalizing currents flow through these signal lines. These equalizing currents can distort the signals.

This makes correct equipotential bonding imperative.

- The cross section of the equipotential bonding line must be large enough (i.e., at least 10 mm^2).
- The space between signal cable and related equipotential bonding line must be kept as small as possible (i.e., antenna effect).
- A fine-wire line must be used (i.e., better conduction of high frequencies).
- When connecting equipotential bonding lines to the central equipotential bonding rail, power components and non-power components must be combined.

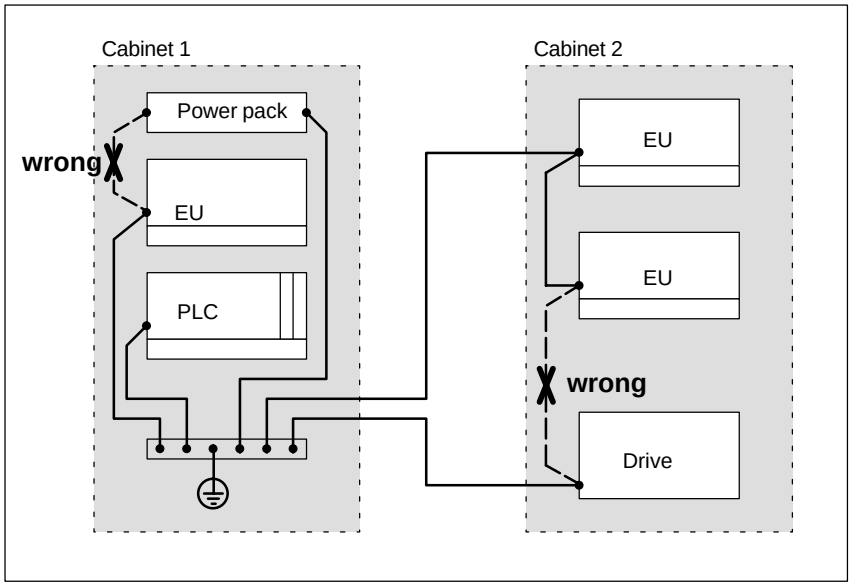


Figure 3-36 Equipotential bonding

The better the equipotential bonding in a system, the smaller the chance of interference caused by fluctuations in potential.

Equipotential bonding should not be confused with the protective grounding of a system. Protective grounding prevents the creation of excessive touch voltages when devices malfunction.

3.5.7 Ground Fault Monitoring with MOBY

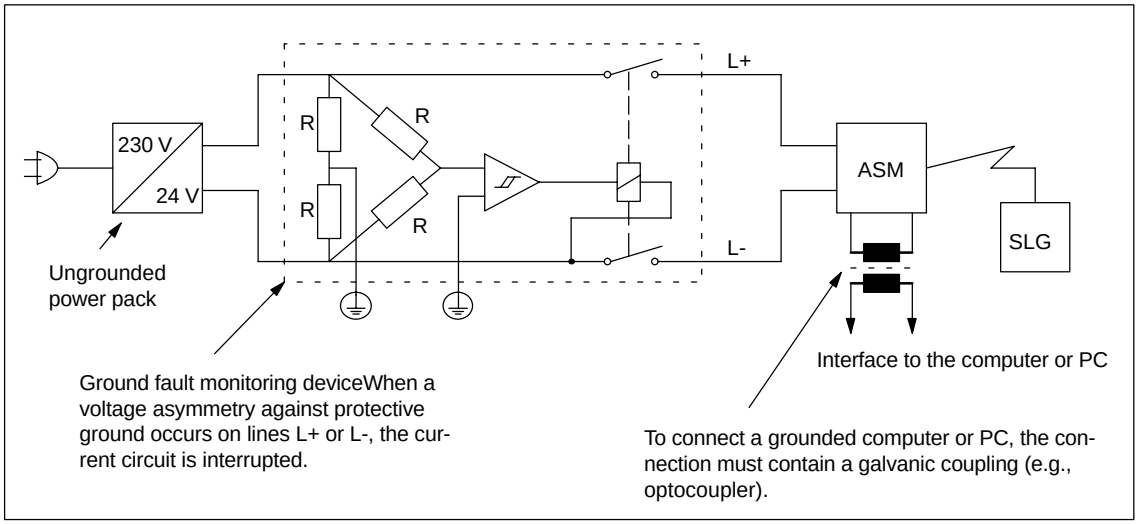


Figure 3-37 Circuit diagram of the principle of grounding fault monitoring

SIMATIC with ASM 400

The SIMATIC is a grounded system. In the power pack of the SIMATIC, 0 V (i.e., signal ground) is connected to the housing. On the ASM 400, the 0 V signal of the external 24 V power pack is connected with 0 V of the SIMATIC. The connection between the ASM 400 (SIMATIC) and the SLG is equipotentially bonded (i.e., RS 422 interface without galvanic isolation). **A direct setup with grounding fault monitoring is not possible.** Proceed as described in the SIMATIC manual if grounding fault monitoring is necessary.

SIMATIC AG 100U with ASM 410

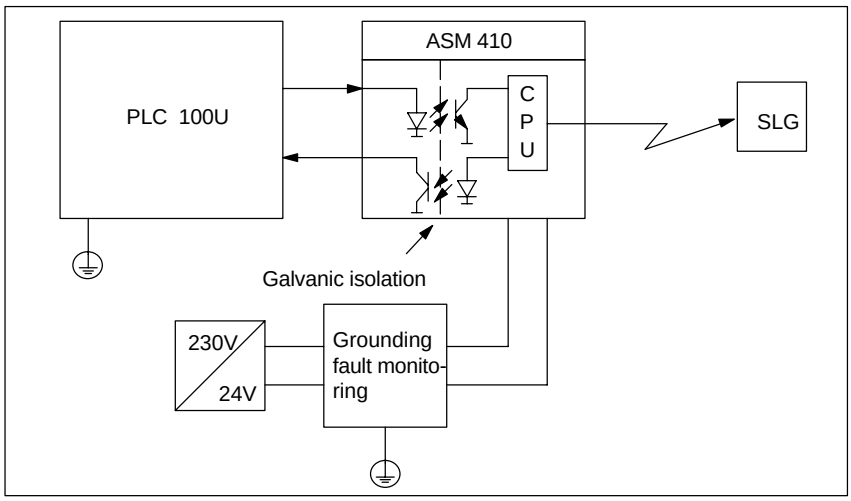


Figure 3-38 SIMATIC PLC 100U with ASM 410

The ASM 410 is equipped with galvanic isolation to the SIMATIC CPU. A layout with grounding fault monitoring is simple.

Serial interface ASM 420

The ASM 420 is available with RS 422, V.24 and TTY interfaces.

A layout with grounding fault monitoring requires galvanic isolation (i.e., a layout with the TTY interface).

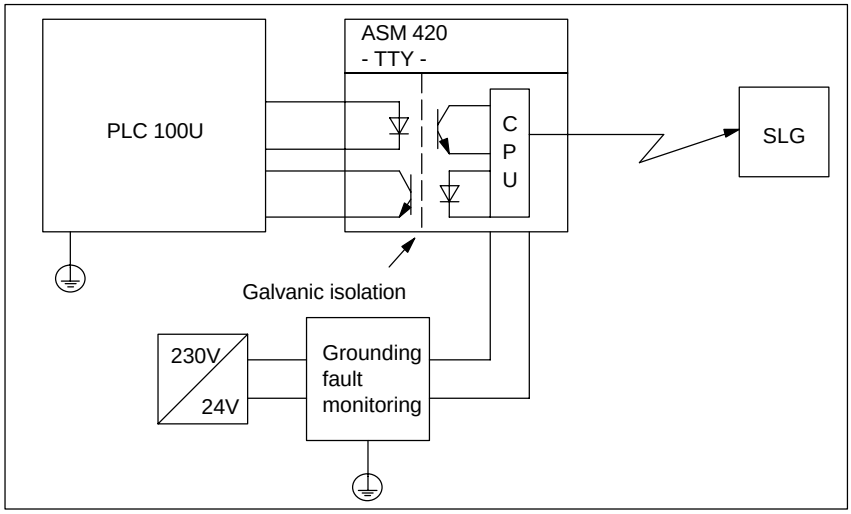


Figure 3-39 Serial interface ASM 420 with TTY interface

3.5.8 Shielding the Cables

To suppress interference in the signal cables, these cables must be shielded.

The best shielding effect is achieved by installation in steel piping. However, this is only necessary when the signal lines must pass through an interference-prone environment. In most cases, the use of braided shields is sufficient. In either situation, correct connection is decisive for the shielding action.

Note

A shield which is not connected at all or is connected incorrectly has no shielding effect.

The following principles apply.

- For analog signal lines, the shield connection must be one-sided and on the receiver side.
- For digital signal lines, the shield connection must be two-sided on the housing.
- Since interference signals are frequently in the HF range (i.e., > 10 kHz), connection of the HF-capacity shield must be provided over a large surface.

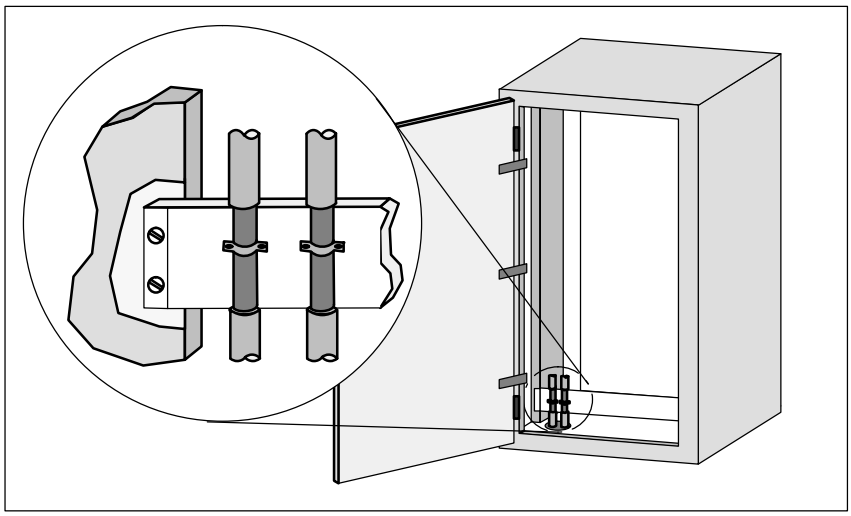


Figure 3-40 Shielding of the cables

The shield rail must be connected to the housing of the switching cabinet over a large surface (i.e., good conductivity) and must be located as close to the cable lead-in as possible. The cables must be bared and clamped (high-frequency clamp) to the shield rail or be bound with cable binders. The location must have good conductivity.

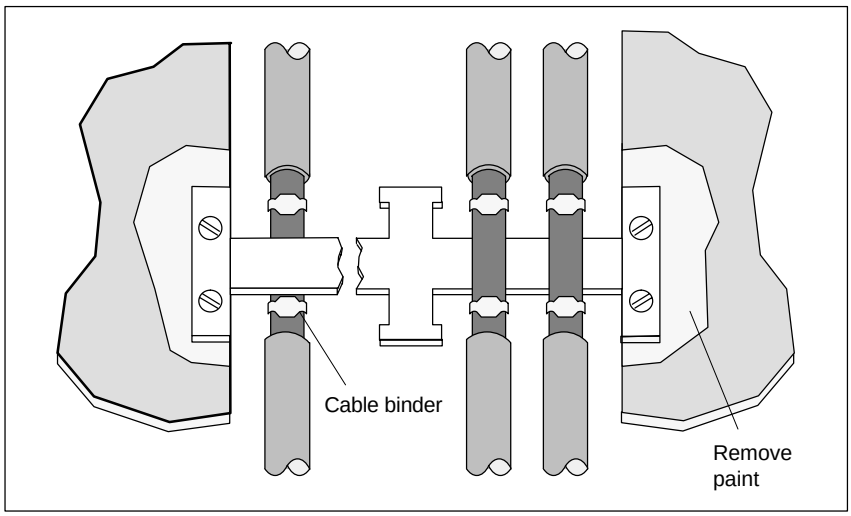


Figure 3-41 Connection of the shield rail

The shield bar must be connected with the protective ground (PE) bar.

When shielded cables must be interrupted, the shield must also be applied to the plug connector housing. Only suitable plug connectors may be used.

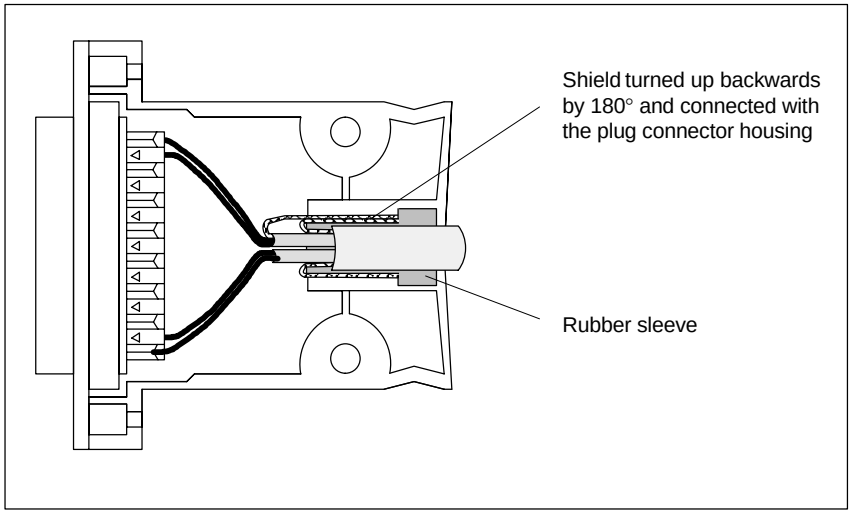


Figure 3-42 Interruption of shielded cables

When adapter plugs which do not have suitable shield termination are used, the shield must be continued through cable clamps to the point of interruption. This ensures a large-surface, HF conductive connection.

3.5.9 Basic Rules on EMC

Electromagnetic compatibility (i.e., EMC) can often be ensured by following a few elementary rules. Rules which apply to the layout of the cabinet are listed below.

Shielding via housing

- Protect the programmable controller from external interference by installing it in a cabinet or housing. The cabinet or the housing must be included in the grounding connection.
- Shield electromagnetic fields of inductivity from the programmable controller with separator plates.
- Use metallic plug housings for shielded data transmission lines.

Large-surface grounding connection

- Connect all inactive metal parts with low HF resistance over a large surface.
- Provide a large-surface connection between the inactive metal parts and the central grounding point.
- Remember to connect the shield bar to ground (i.e., a large-area connection of the shield bar to ground must be provided).
- Aluminum parts should not be used for grounding connections.

Planning the cabling

- Organize the cables into groups, and install these groups separately.
- Always install high-voltage current lines and signal lines in separate ducts or bundles.
- Introduce all cabling into the cabinet from only one side and, if possible, at one level.
- Install the signal lines as close to the grounding surfaces as possible.
- Twist the feeder and return conductors of individually installed conductors.

Shielding the lines

- Shield the data transmission lines, and apply the shield on both sides.
- Shield the analog lines, and apply the shield on one side (e.g., on the drive).
- Always apply the line shields at the cabinet entrance to the shield bar over a large surface, and secure these with clamps.
- Continue the applied shield without interruption to the module.
- Use braided shields and not foil shields.

Power supply and signal filter

- Only use power supply filters with metal housings.
- Connect the filter housing (i.e., connection must be low HF resistant and over a large surface) to cabinet ground.
- Never secure the filter housing to painted surfaces.
- Secure the filter at the cabinet entrance or in the direction of the interference source.

3.6 Concept of MOBY Shielding

With MOBY the data are transferred between ASM and SLG over an RS 422 interface at a speed of 19200 baud. The distance between ASM and SLG may be up to 1000 m. MOBY cable installation should be treated the same as that of a data processing system. Special attention should be paid to shielding of all data cables. The following figure shows the primary points required for a secure layout.

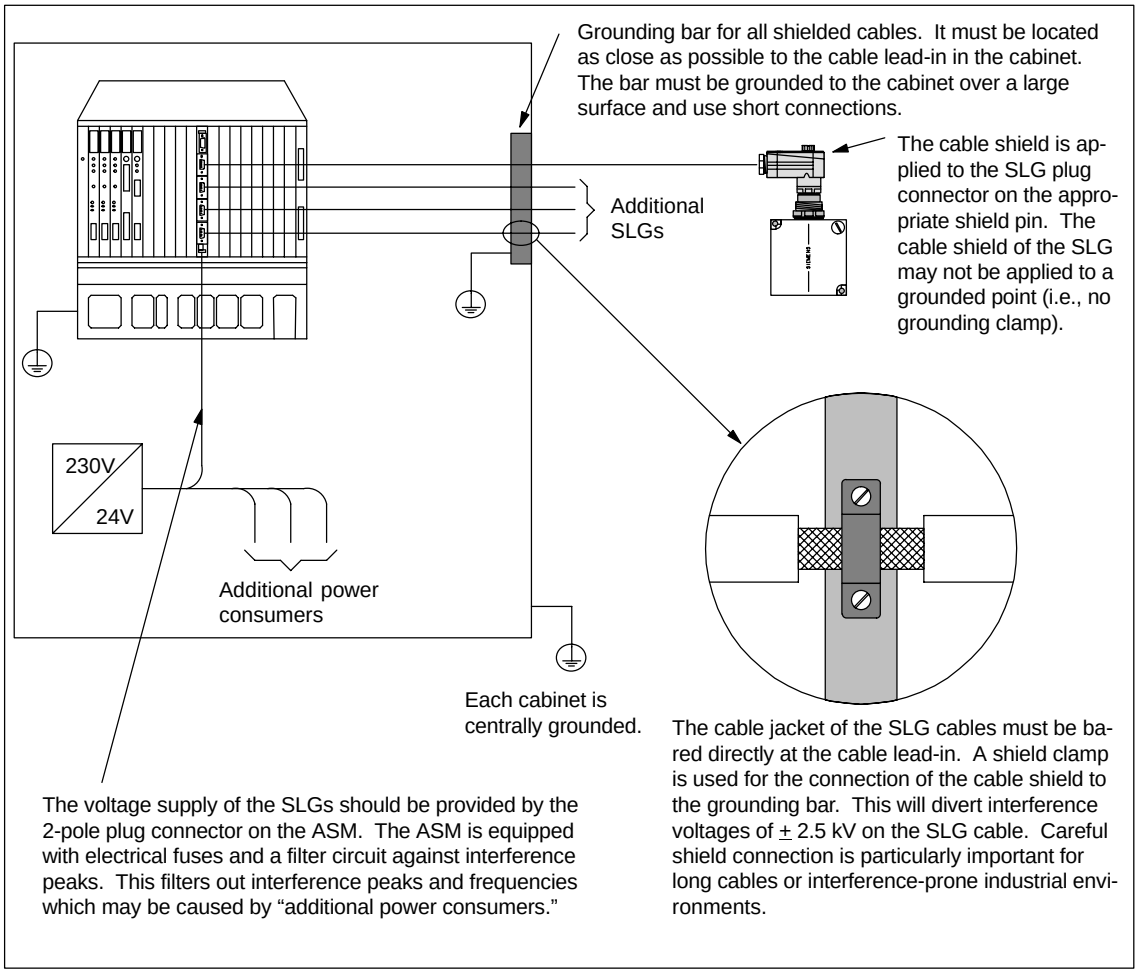

Grounding bar for all shielded cables. It must be located as close as possible to the cable lead-in in the cabinet. The bar must be grounded to the cabinet over a large surface and use short connections.
The cable shield is applied to the SLG plug connector on the appropriate shield pin. The cable shield of the SLG may not be applied to a grounded point (i.e., no grounding clamp).
Additional SLGs
230V
24V
Additional power consumers
Each cabinet is centrally grounded.
The cable jacket of the SLG cables must be bared directly at the cable lead-in. A shield clamp is used for the connection of the cable shield to the grounding bar. This will divert interference voltages of ± 2.5 kV on the SLG cable. Careful shield connection is particularly important for long cables or interference-prone industrial environments.
The voltage supply of the SLGs should be provided by the 2-pole plug connector on the ASM. The ASM is equipped with electrical fuses and a filter circuit against interference peaks. This filters out interference peaks and frequencies which may be caused by “additional power consumers.”

Figure 3-43 Simple layout with ASM 400

Layout with ASM 420

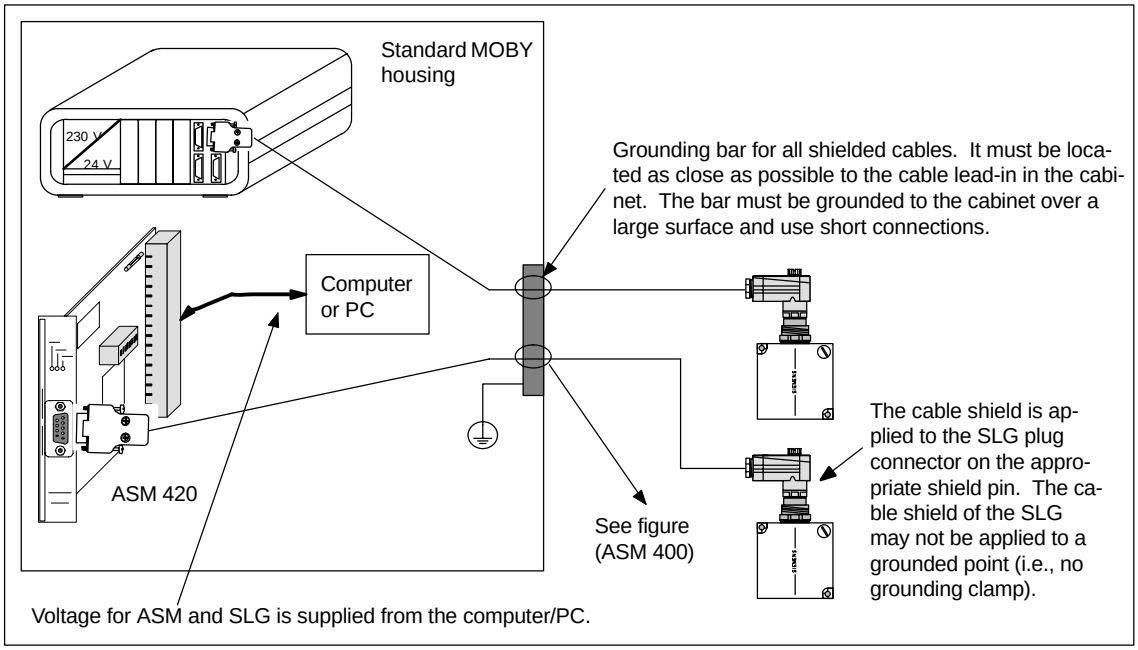

Standard MOBY housing
230 V
24 V
Grounding bar for all shielded cables. It must be located as close as possible to the cable lead-in in the cabinet. The bar must be grounded to the cabinet over a large surface and use short connections.
Computer or PC
ASM 420
The cable shield is applied to the SLG plug connector on the appropriate shield pin. The cable shield of the SLG may not be applied to a grounded point (i.e., no grounding clamp).
See figure (ASM 400)
Voltage for ASM and SLG is supplied from the computer/PC.

Figure 3-44 Layout with ASM 420

Standard MOBY housing

The standard MOBY housing can be used as a stand-alone housing or as a built-in housing. When used as a stand-alone housing, connection of the SLG to the standard MOBY cable is sufficient for an EMC layout.

Layout of an S7-300 with MOBY

When connecting the SLG to the ASM 470, it is essential that a shield connection terminal be used for the cable shield. Shield connection terminals and holders are standard components of the S7-300 product family.

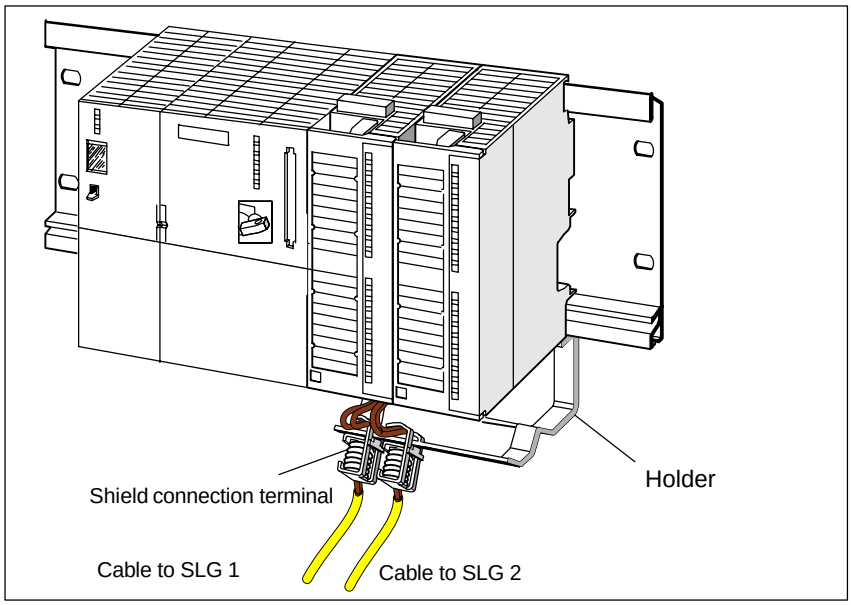


Figure 3-45 Layout of the ASM 470 with shield connecting element

Cabling for ASM 470

To ensure EMC, an S7-300 shield connecting element must be used for the SLG cable. See figure 3-45. The shield of the SLG cable must be bared as shown in figure 3-46.

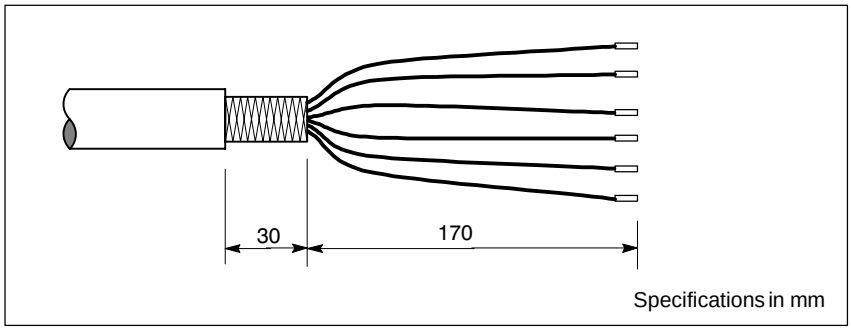


Figure 3-46 Baring of the cable shield

Voltage supply of the SLG with power pack

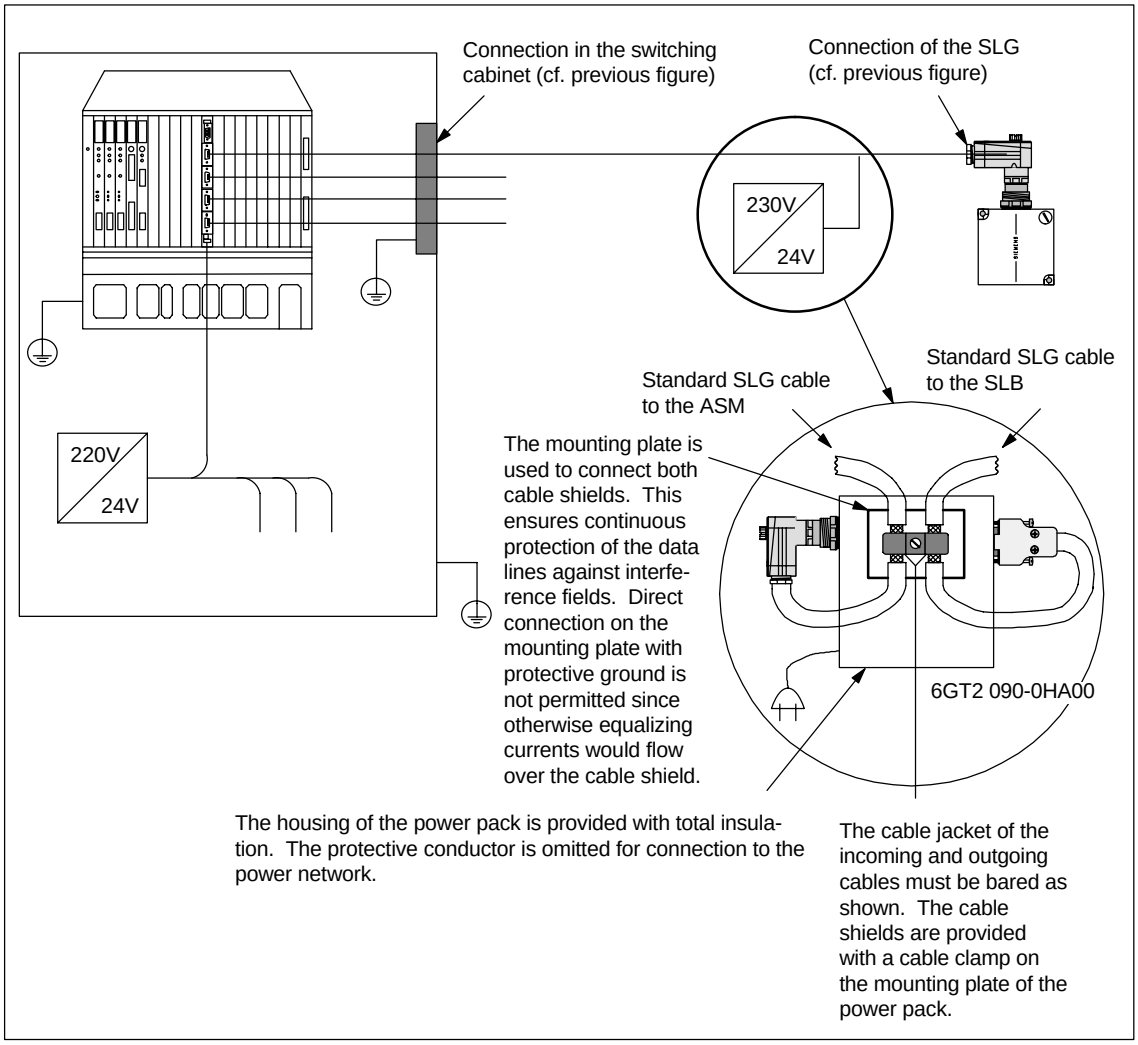

Connection in the switching cabinet (cf. previous figure)
Connection of the SLG (cf. previous figure)
230V
24V
220V
24V
Standard SLG cable to the ASM
Standard SLG cable to the SLB
The mounting plate is used to connect both cable shields. This ensures continuous protection of the data lines against interference fields. Direct connection on the mounting plate with protective ground is not permitted since otherwise equalizing currents would flow over the cable shield.
6GT2 090-0HA00
The housing of the power pack is provided with total insulation. The protective conductor is omitted for connection to the power network.
The cable jacket of the incoming and outgoing cables must be bared as shown. The cable shields are provided with a cable clamp on the mounting plate of the power pack.

Figure 3-47 Voltage supply with power pack

Connection of other modules (e.g., ASM 410)

To divert interference which may occur on the connection cable to the SLG, proceed as described for the ASM 400.

3.7 Cable and Plug Connector Assignments

The cable jacket of standard SLG connection cables used with MOBY is made of polyurethane (i.e., PUR in accordance with VDE 0250). This ensures very good cable resistance to oils, acids, caustic solutions, hydraulic fluids and high resistance to UV.

3.7.1 Cable Configuration

The cable between ASM and SLG requires six cores + shield. Four of these cores are assigned to the serial data interface. The power supply of the SLG requires two cores. The data can be transferred over distances of up to 1000 m, almost without regard to the diameter of the wire.

Since voltage is present on the connection cable due to the current consumption of the SLG, permitted cable lengths are usually shorter than 1000 m. The length depends on the current consumption of the SLG and the ohmic resistance of the connection cable. The following table shows an overview of permissible cable lengths.

Table 3-14 Cable configuration

Conductor Cross Section in mm²	**Conductor Diameter in mm**	**Resistance Ω/km[1]**	**SLG 70 ANT 0/ANT 1 SLG 72 SLG 75 ANT 12/ANT 30 Max. Cable Length in m (I=180 mA)**	
			U_V=24V	**U_V=30V**
0.07[2]	0.3[2]	550	40	100
0.2	0.5	185	120	300
0.5	0.8	70	310	790
0.8[2]	1.0[2]	50	440	1000
1.5[2]	1.4[2]	24	920	1000

1 The resistance values are average values. They refer to the forward and return conductors. A single wire has half the resistance.

2 Use of these conductor cross sections requires crimp contacts (not included) in the SLG connection plug.

Field with gray background:
Recommended by Siemens: Standard cable, LiYCY, 6 x 0.25, shielded. The cable is available from Siemens under the order number 6GT2 090-0A...

Grounding of the cable

We recommend always applying the shield of the SLG cable to a grounding bar over a large surface.

Supplementary power pack for SLG

When an additional power pack is installed in the vicinity of the SLG, the max. 1000 m cable between the ASM and SLG can always be used.

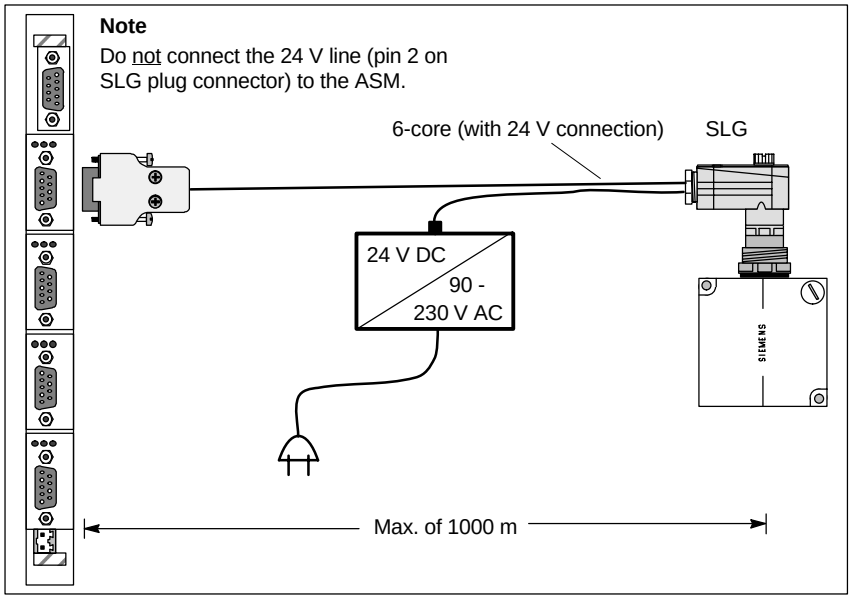

Note
Do not connect the 24 V line (pin 2 on SLG plug connector) to the ASM.
6-core (with 24 V connection)
SLG
24 V DC
90 - 230 V AC
SIEMENS
Max. of 1000 m

Figure 3-48 SLG with extra power pack

The power pack shown in the drawing can be ordered from Siemens under the number 6GT2 494-0AA00 (see chap. 7.4).

Note

With some restrictions, the power pack can be used as the main power pack for the ASM 400, ASM 420, ASM 724 or ASM 754. See figure 3-49.

The maximum current of the power pack (2.2 A) may not be exceeded.

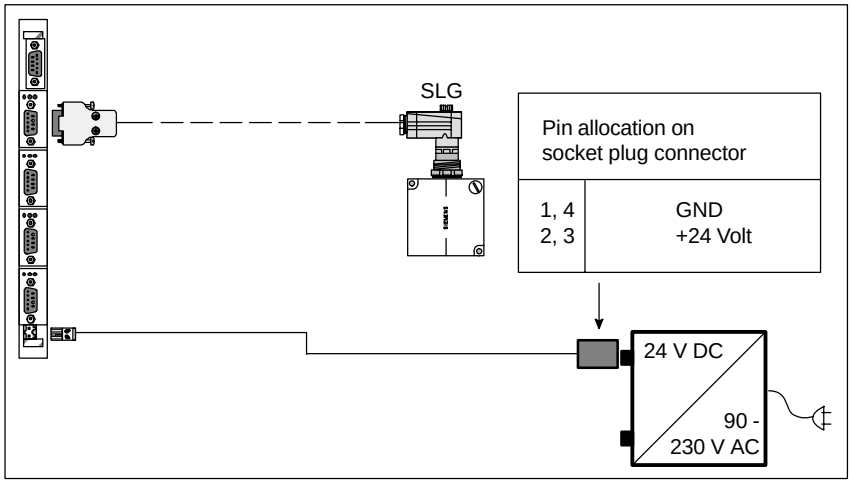


Figure 3-49 MOBY wide-range power pack on the ASM 400

3.7.2 Plug Connector Assignment

SLG 70, SLG 72, SLG 75

Plug connector on the SLG

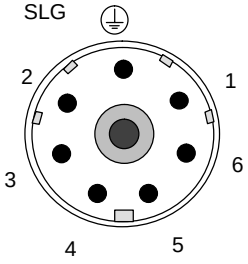
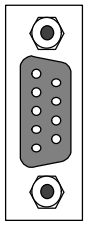


Table 3-15 Plug connector assignment of the SLG plug connector[1]

Pin	Designation
1	- Receiving
2	+ 24 Volt
3	Ground (0 V)
4	+ Sending
5	- Sending
6	+ Receiving
⏚	Cable shield

1 This plug connector applies to SLG 70 ANT 0/ANT 1, SLG 72, SLG 75 ANT 12/ ANT 30

Plug connector on the ASM



9-pin subminiature D plug connector with screw-type lock

Table 3-16 Plug connector assignment of the 9-pin subminiature D plug connector[1]

Pin	Desigantion
1	Not used
2	+ Sending
3	+ Receiving
4	Not used
5	- Receiving
6	- Sending
7	Ground (0 V)
8	+ 24 Volt (see caution note)
9	Not used
Geh.	Cable shield

1 This plug connector assignment applies to:
ASM 400, ASM 420 => SLG; ES 030 => SLG

Note

When making your own cables, remember that the “sending” signal of the SLG must be connected to the “receiving” signal of the ASM, or vice versa.

Caution

When using the supplementary power pack in the vicinity of the SLG, do not wire this pin to the ASM. Cf. table 3-16.

SLA 71

Plug connector on the SLA

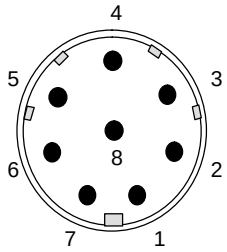


Table 3-17 Plug connector assignment of SLA plug[1]

Pin	Designation
1	+12 Volt
2	+ Send
3	+ Receive
4	Not used
5	- Receive
6	- Send
7	Not used
8	Ground (0 V)

1 This plug connector applies to SLA 71

9-pin submin D plug connector with screw-type lock

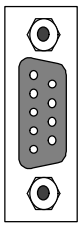


Table 3-18 Plug connector assignment (9-pin, submin D)[1]

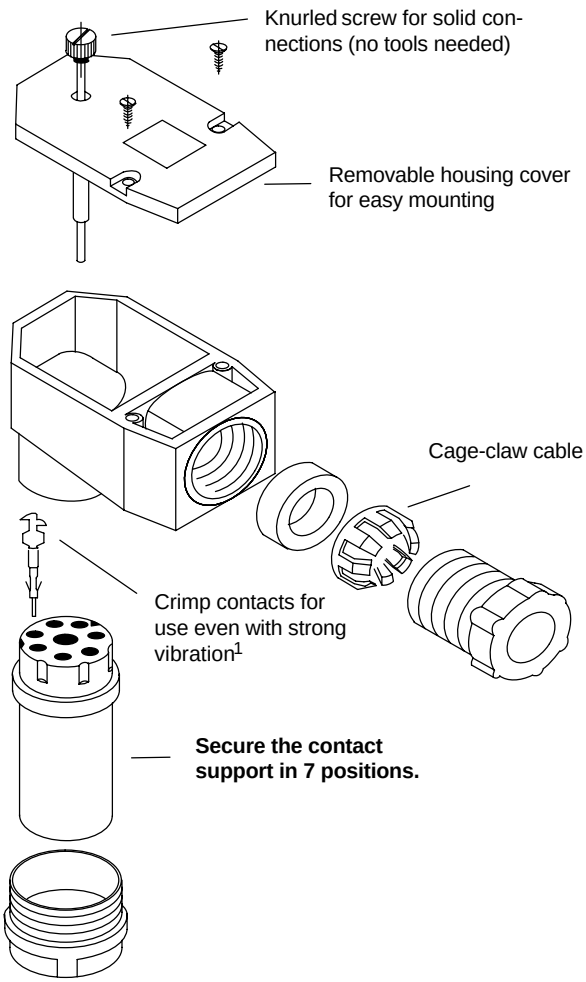
Pin	Designation
1	+12 Volt
2	+ Send
3	+ Receive
4	Not used
5	- Receive
6	- Send
7	Ground (0 V)
8	Not used
9	Not used

1 This connector assignment applies to ASM 724, ASM 754 <=> SLA 71.

Installing the SLG plug connector

If the SLG plug connector has to be turned in a different direction when using a prefabricated cable, proceed as shown in the drawing below to position the contact support differently.

The plug connector on the SLG cannot be turned.


Knurled screw for solid connections (no tools needed)
Removable housing cover for easy mounting
Cage-claw cable retainer
Crimp contacts for use even with strong vibration1
Secure the contact support in 7 positions.

1 Hand crimp snap-on conector (Type XZC0700, order no. 932507-001)
Order from:
Hirschmann GmbH+Co.
72606 Nuertingen
Tel: 07127/14-1479

Figure 3-50 Drawing of mounting the SLG plug connector

3.7.3 Connection Cables

Connection cable for ASM 400/420, ES 030 ↔ SLG 6GT2 091-0A... Straight plug connector: 6GT2 091-2A...

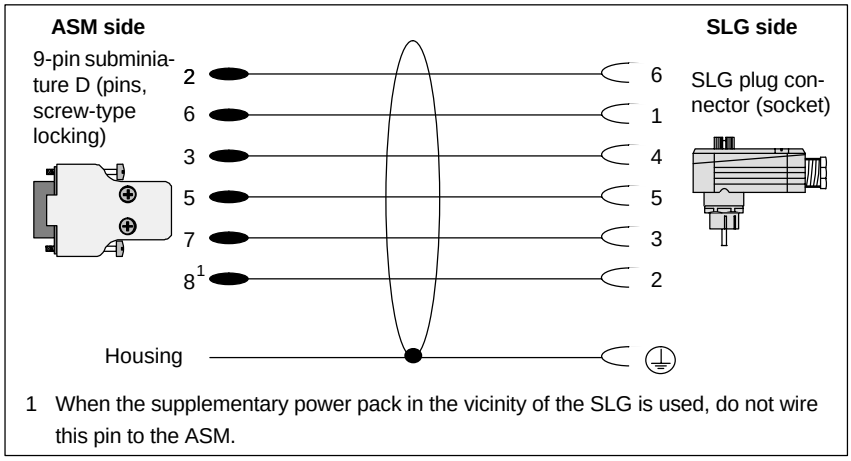


Figure 3-51 Connection cable: ASM 400/420/ES 030 ↔ SLG

Connection cable for ASM 410 ↔ SLG 6GT2 091-0D..., Straight plug connector: 6GT2 091-2D...

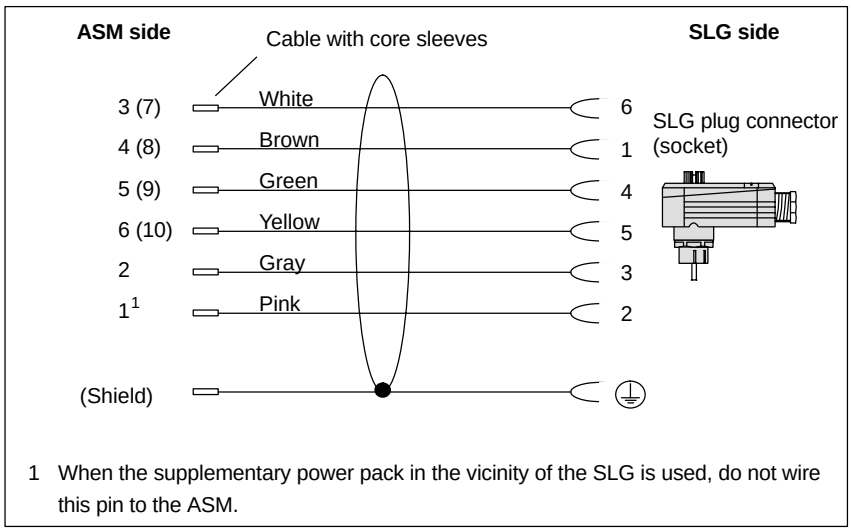


Figure 3-52 Connection cable: ASM 410 ↔ SLG

Caution

The cable shield must be secured with a shield clamp directly on the interface module and grounded on a grounding bar.

Connection cable for ASM 450 ↔ SLG 6GT2 091-1C...

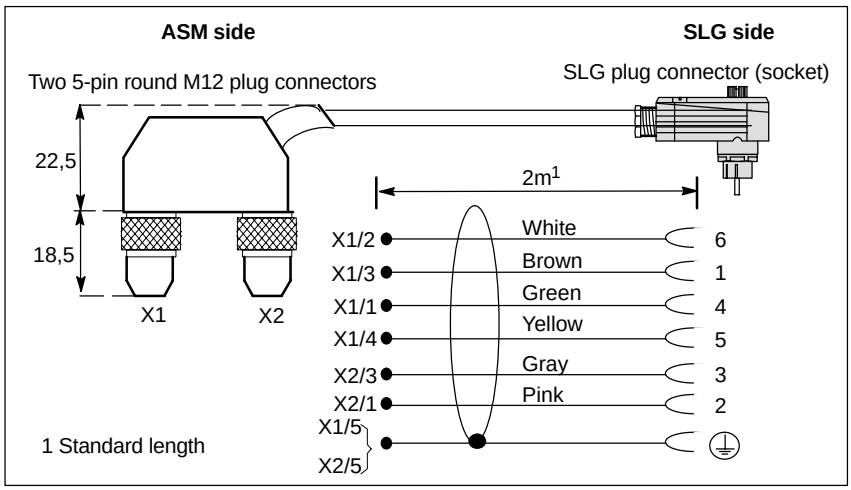


Figure 3-53 Connection cable: ASM 450 ↔ SLG

Connection cable for ASM 470 ↔ SLG 6GT2 091-0E... Straight plug connector: 6GT2 091-2E...

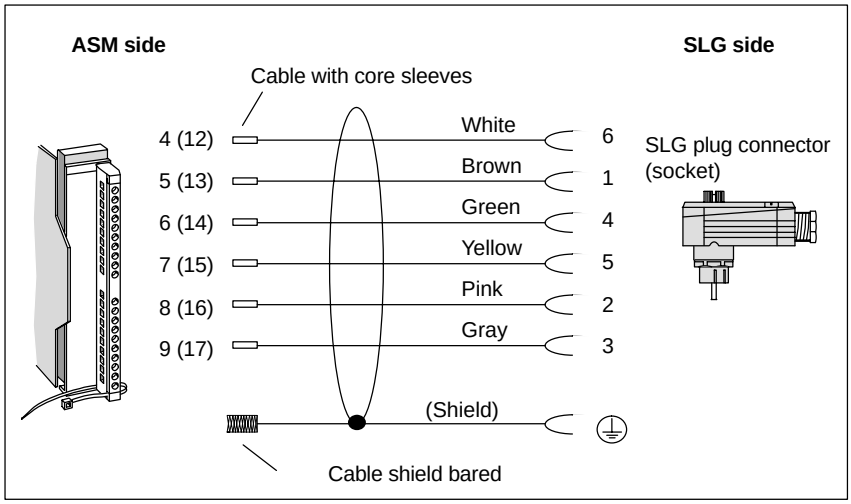


Figure 3-54 Connection cable: ASM 470 ↔ SLG

Connection cable RS 232 PC ↔ ASM 724 6GT2 391-0B...

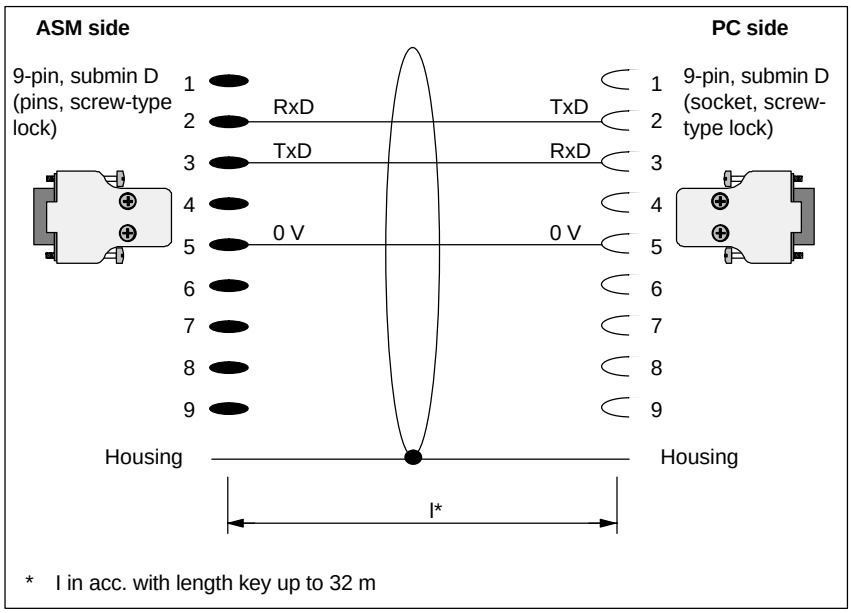


Figure 3-55 Connection cable RS 232 PC ↔ ASM 724

Connection cable ASM 724/754 ↔ SLA 71 6GT2 391-1AH50

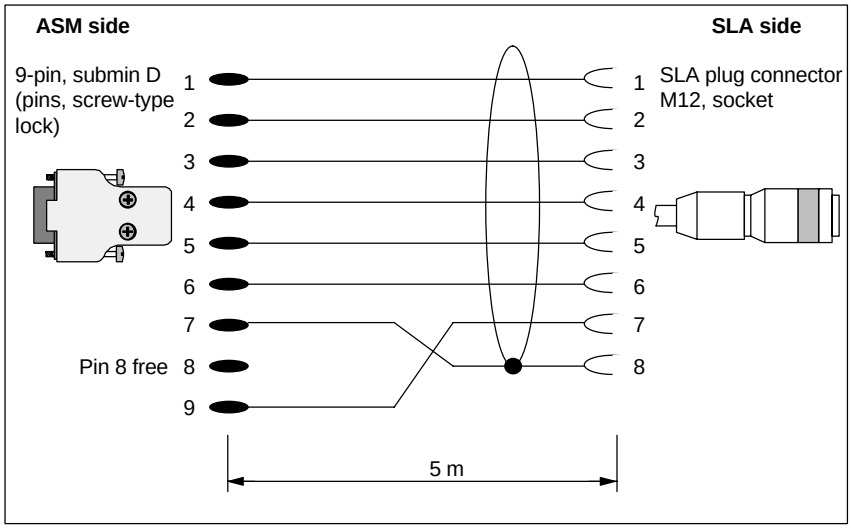


Figure 3-56 Connection cable ASM 724/754 ↔ SLA 71

Extension cable ASM 724/754 ↔ SLA 71 6GT2 391-1BN25

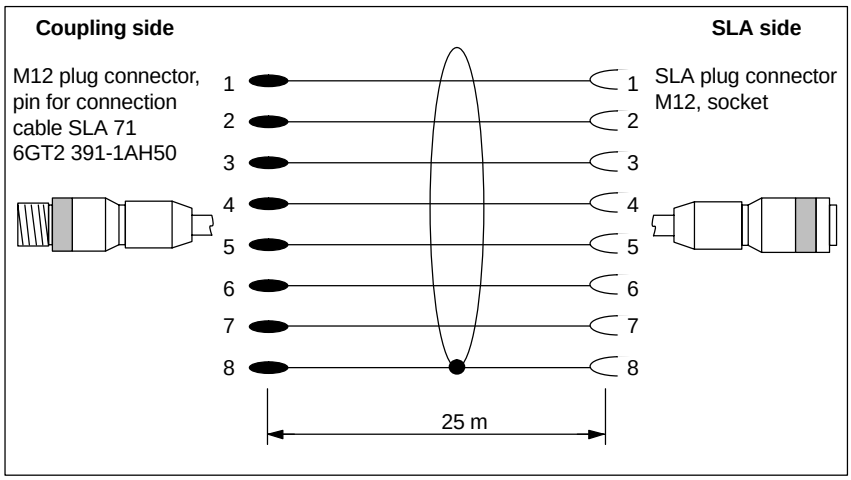
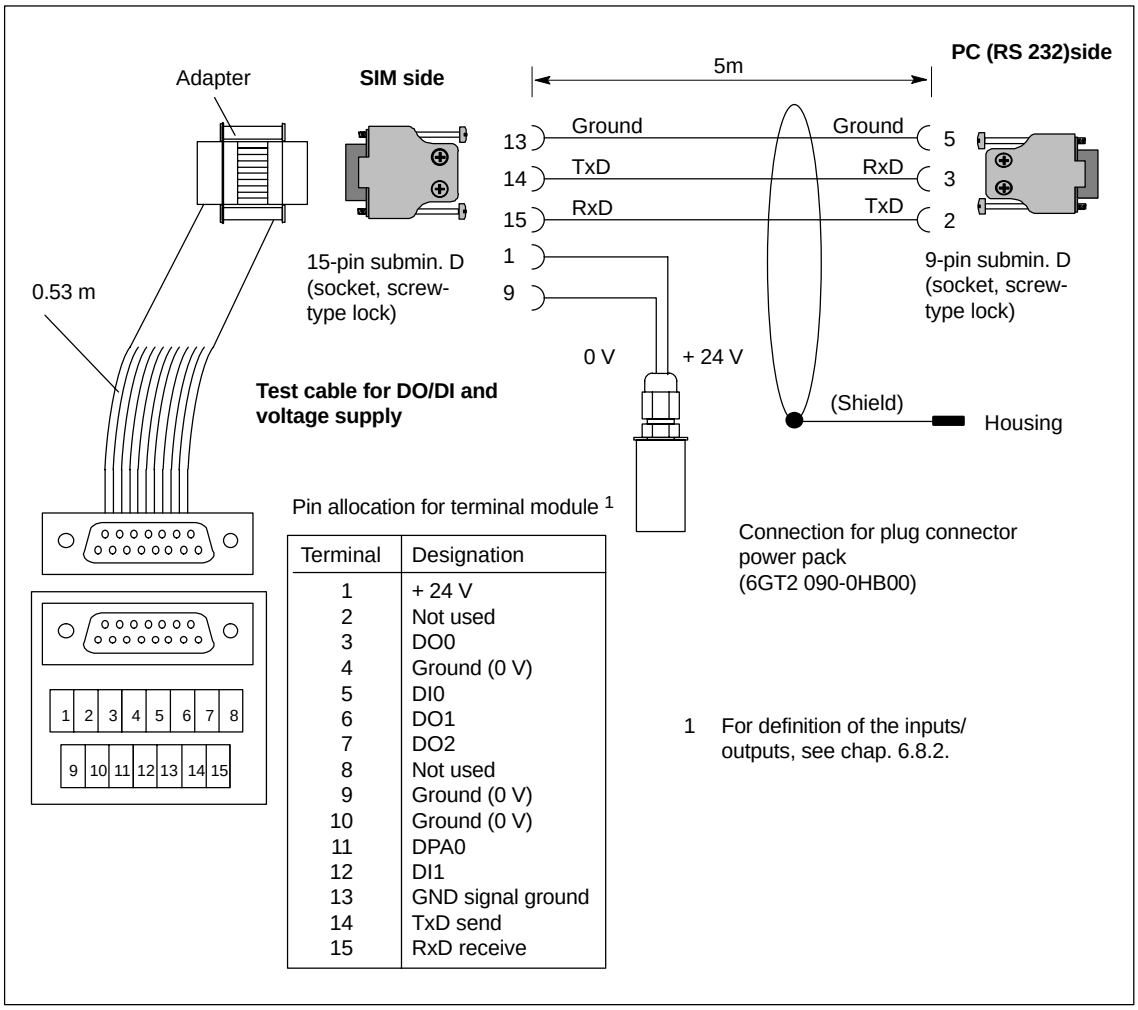


Figure 3-57 Extension cable ASM 724/754 ↔ SLA 71

Connection cable
RS 232 PC ↔ SIM
6GT2 391-1DH50



Pin allocation for terminal module [1]

Terminal	Designation
1	+ 24 V
2	Not used
3	DO0
4	Ground (0 V)
5	DI0
6	DO1
7	DO2
8	Not used
9	Ground (0 V)
10	Ground (0 V)
11	DPA0
12	DI1
13	GND signal ground
14	TxD send
15	RxD receive

Connection for plug connector
power pack
(6GT2 090-0HB00)

1 For definition of the inputs/
outputs, see chap. 6.8.2.

Figure 3-58 Connection cable for RS 232 PC ↔ SIM

3.7.4 Length Key

The following length key can be used for all connection cables listed in chapter 3.7.3.

Exceptions:

- Connection cable ASM 724/754 ↔ SLA 71, order no. 6GT2 391-1AH50
- Extension cable ASM 724/754 ↔ SLA 71, order no. 6GT2 391-1BN25
- Connection cable RS 232 PC ↔ SIM, order no. 6GT2 391-1DH50

The preferred lengths for stub lines are shown in **bold** type.

Table 3-19 Length key

Length of the Stub Line	Order No. Supplement 6GT2 09.-0.□□□ ↑↑↑
0.8 m	E 8 0
1.2 m	H 1 2
1.6 m	H 1 6
2.0 m	**H 2 0**
2.5 m	H 2 5
2.8 m	H 2 8
3.2 m	H 3 2
3.6 m	H 3 6
5.0 m	**H 5 0**
8.0 m	H 8 0
10.0 m	**N 1 0**
12.0 m	N 1 2
16.0 m	N 1 6
20.0 m	**N 2 0**
32.0 m	N 3 2
50.0 m	**N 5 0**
80.0 m	N 8 0
120.0 m	T 1 2
160.0 m	T 1 6
200.0 m	T 2 0
320.0 m	T 3 2
500.0 m	T 5 0
800.0 m	T 8 0

4 Mobile Data Memories

4.1 Introduction

Application area

MOBY identification systems ensure that useful data accompany a product from the very beginning.

Mobile data memories are attached to the product or its conveyor or its packaging unit and are written, changed and read - all without contact. All important information related to production and material flow control is included right on the product.

Its sturdy design permits use in rugged environments and makes the MDS insensitive to many chemical substances.

Layout and functions

The primary components of the mobile data memories (i.e., MDS) include logic, antenna and EEPROM.

When an MDS moves into the transmission field of the read-write device/ read-write antenna (i.e., SLG/SLA), the power supply unit generates and monitors the necessary power for all switching elements. The pulse-coded information is conditioned for further processing as purely digital signals. In addition to managing the various memories, the monitoring unit takes care of data handling and the check routines.

Overview

Table 4-1 Overview of MDS

MDS Type	Memory Size Gross/Net	Temperature Range (During Operation)	Dimensions (W x H x D in mm)	Protection Rating
MDS E600	1024-byte EEPROM (gross) 752-byte net capacity	-25° to +60° C	85x54x0.8	IP 68
MDS E611	1024-byte EEPROM (gross) 752-byte net capacity	-25° to +70° C	85x54x2.5	IP 67
MDS E623	1024-byte EEPROM (gross) 752-byte net capacity	-25° to +85° C	∅10x4.5	IP 67
MDS E624	1024-byte EEPROM (gross) 752-byte net capacity	-25° to +125° C	∅27x4	IP 67

Definition of IP 67

- Protection against the penetration of dust (i.e., dustproof)
- Total protection again accidental touch
- Protection against water under certain pressure and time conditions

Definition of IP 68

- Protection against penetration of dust (i.e., dust-proof)
- Full protection against touch
- MDS can be continuously submerged in water. Contact manufacturer for requirements.

Operational requirements/ environmental requirements

Table 4-2 Operational requirements/environmental requirements of MDS

Requirement	MDS E600	MDS E611/MDS E623/ MDS 624
Proof of physical strength is determined by an oscillation test. Test conditions: • Frequency range • Amplitude of the displacement • Acceleration • Test duration per axis • Throughput speed	ISO 7810, ISO 10 373	EN 60721-3-7, Class 7M3 2 to 500 Hz 7.5 mm (2 to 26 Hz) 20 g (26 to 500 Hz) 20 frequency cycles 1 octave/min.
Proof of physical strength is determined by continuous shock stress. Test conditions: Acceleration Duration Test duration per axis		 EN 60721-3-7, Class 7M3 100 g 6 msec 500 impacts per axis
Torsion and bending stress	In acc. w. ISO 10 373 / ISO 7816-1	Not permitted
Protection rating	IP 68 in acc. w. EN 60529	IP 67 in acc. w. EN 60529
Ambient temperature During operation During transportation and storage	 -25° to +60° C -25° to +60° C	 -25° C to +70° C/+85° C/+125° C -40° C to +85° C/+100° C /+150° C
Temperature gradient over storage temperature range in acc. w. part 2-4 of DIN IEC 68	3° C/min	3° C/min
Temperature gradient for rapid temperature change in acc. w. part 2-14 of DIN IEC 68	Duration of 30 min per maximum Transition from one maximum to another: Approx. 10 sec, 100 cycles	Duration of 30 min per maximum Transition from one maximum to another: Approx. 10 sec, 100 cycles

Warning

The values for shock and vibration are maximum values and may not occur continuosly.

4.2 MDS E600

Ordering data

Table 4-3 Ordering data for MDS E600

	Order Number
MDS E600 mobile data memory with 752-byte EEPROM	6GT2 300-0AA00
Accessories: Mounting bracket	 6GT2 390-0AA00

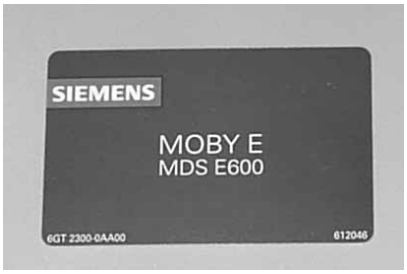


Figure 4-1 MDS E600

Technical data

Table 4-4 Technical data of MDS E600

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at +40° C)	2 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200,000
Typical write cycles	1,000,000
Data retention time (at < +40° C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	ISO 10 373/ISO 7810
Torsion and bending stress	ISO 10 373/ISO 7816-1
Mounting of the MDS	Adhesive/mounting bracket
Protection rating in acc. w. EN 60529	IP 68
Physical layout Color Material Dimensions (L x W x H) in mm	Laminated PVC card, printable on one side Anthracite/white PVC 85.6 x 54 x 0.76

Table 4-4 Technical data of MDS E600

Ambient temperature	
During operation	-25° to +60° C
During transportation and storage	-25° to +60° C
Weight, approximate	6 g

Field data

Table 4-5 Field data of MDS E600

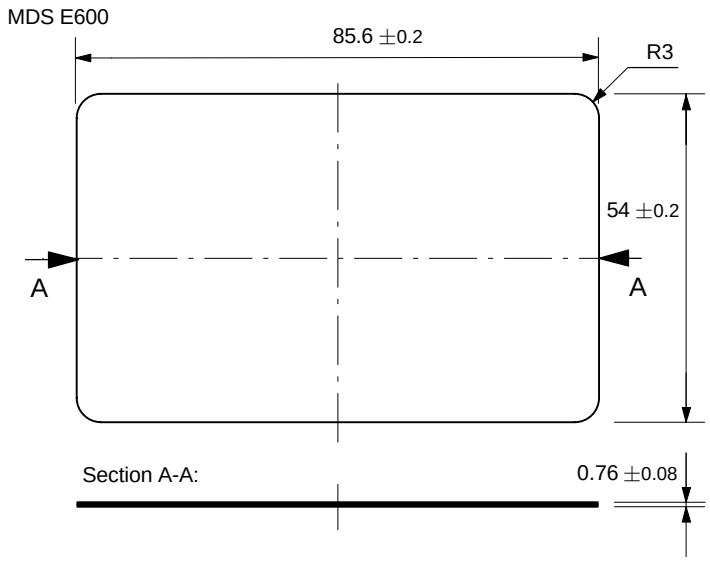
	SLG 70 ANT 0	**SLG 70 ANT 1**	**SLG 72**	**SLA 71**
Operating distance (S_a)	---	0 to 50 mm	0 to 50 mm	0 to 50 mm
Limit distance (S_g)	---	70 mm	70 mm	70 mm
Transmission window (L)	---	60 mm (L_d)	75 mm (L_x)[1] 50 mm (L_y)[1]	60 mm (L_d)
Minimum distance from MDS to MDS	---	> 400 mm	> 400 mm	> 400 mm

1 For field geometry, see also figure 5-14.

The field data apply to read and write-accesses of the MDS.

Dimensions (in mm)

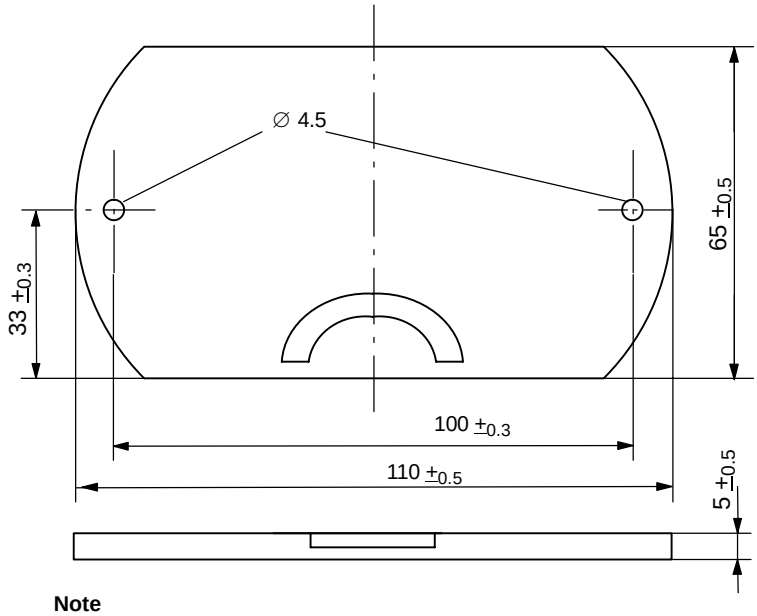
Dimensional drawing



Mounting bracket for MDS E600

The mounting bracket is secured to a non-metallic base with M4 countersunk screws using the holes provided.

Note
The mounting bracket shown here (i.e., order no. 6GT2 390-0AA00) is not suitable for the spacer shown in figure 4-7 (i.e., order no. 6GT2 190-0AA00).



Note
When MDS E600 is mounted on metal, mounting bracket 6GT2190-0AB00 can also be used but only together with spacer 6GT2190-0AA00 (for dimensions, see figure 4-7).

Figure 4-2 MDS E600 and its mounting bracket

Metal-free space

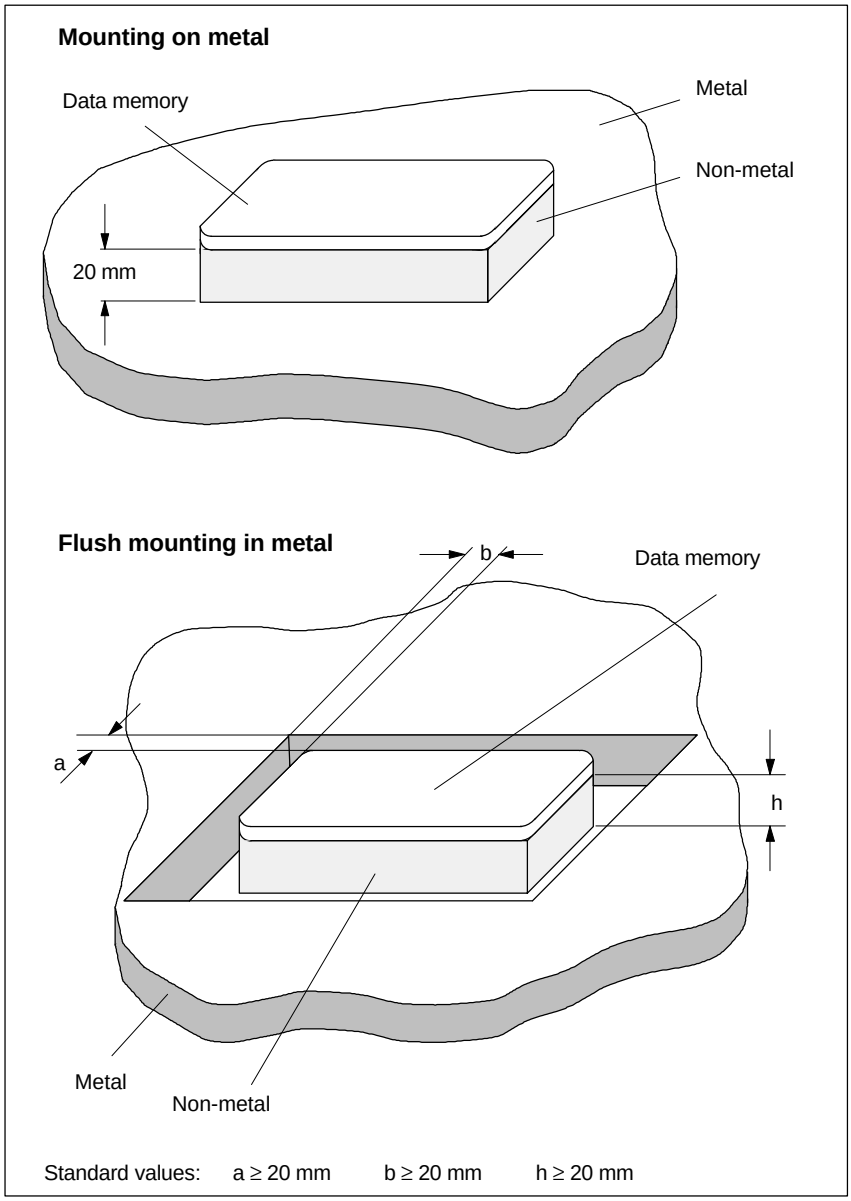


Figure 4-3 Metal-free space for MDS E600

Note

Underranging the standard values a, b and h will significantly reduce the field data.

4.3 MDS E611

Ordering data

Table 4-6 Ordering data for MDS E611

	Order No.
MDS E611 mobile data memory with 752-byte EEPROM	6GT2 300-0BB00
Accessories: Spacer Mounting bracket	 6GT2 190-0AA00 6GT2 190-0AB00

Figure 4-4 MDS E611

Technical data

Table 4-7 Technical data of MDS E611

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at 40° C)	2.5 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200,000
Typical write cycles	1,000,000
Data retention time (at < +40° C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	20 g
Shock	100 g
Torsion and bending stress	Not permitted
Mounting of the MDS	Adhesive/mounting bracket
Protection rating in acc. w. EN 60529	IP 67
Physical layout Color Material Dimensions (W x H x D) in mm	Epoxy card Anthracite/black Fiber glass-reinforced epoxy resin 85.8 x 54.1 x 2.5

Table 4-7 Technical data of MDS E611

Ambient temperature During operation During transportation and storage	 -25° to +70° C -40° to +85° C
Weight, approximate	21 g

Field data

Table 4-8 Field data of MDS E611

	SLG 70 ANT 0	SLG 70 ANT 1	SLG 72	SLA 71
Operating distance (S_a)	---	10 to 70 mm	10 to 70 mm	10 to 70 mm
Limit distance (S_g)	---	100 mm	100 mm	100 mm
Transmission window (L)	---	80 mm	90 mm (L_x)[1] 60 mm (L_y)[1]	80 mm (L_d)
Minimum distance from MDS to MDS	---	> 400 mm	> 400 mm	> 400 mm

1 For field geometry, see also figure 5-14.

The field data apply to read and write-accesses of the MDS.

Dimensions (in mm)

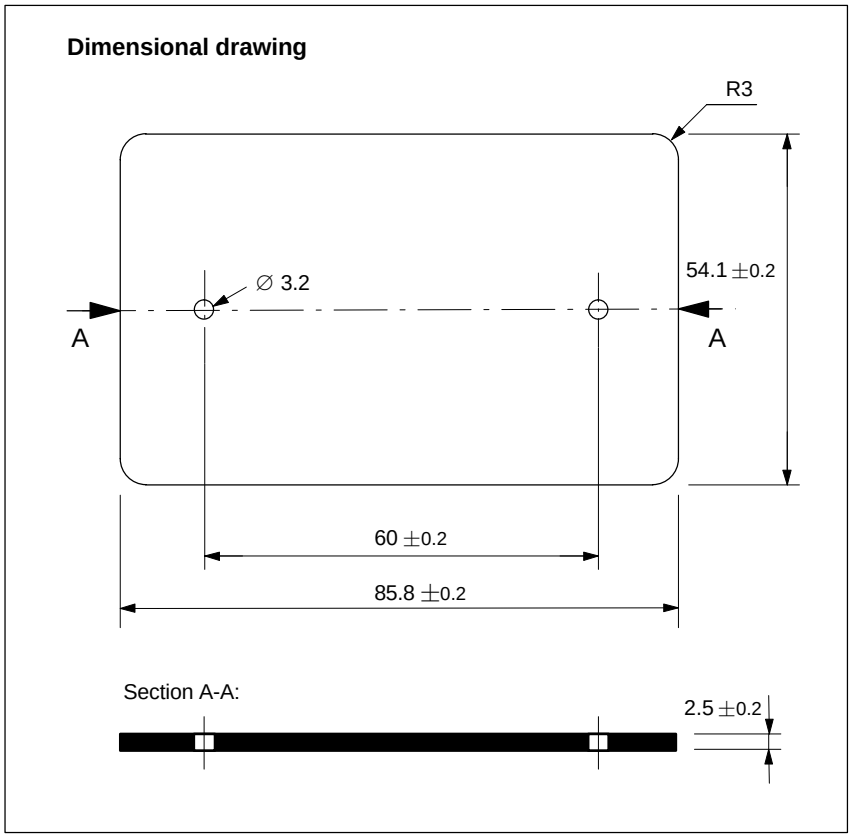


Figure 4-5 Dimensions of MDS E611

Metal-free space

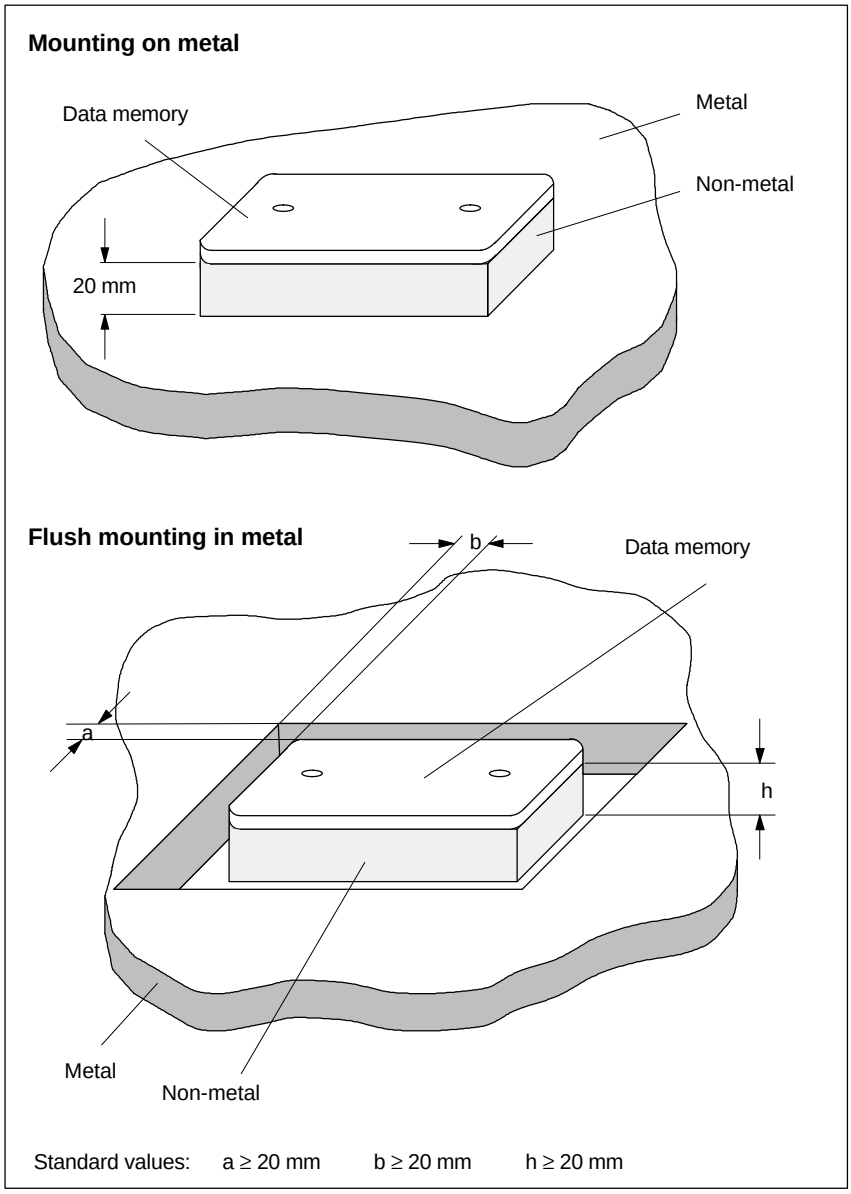


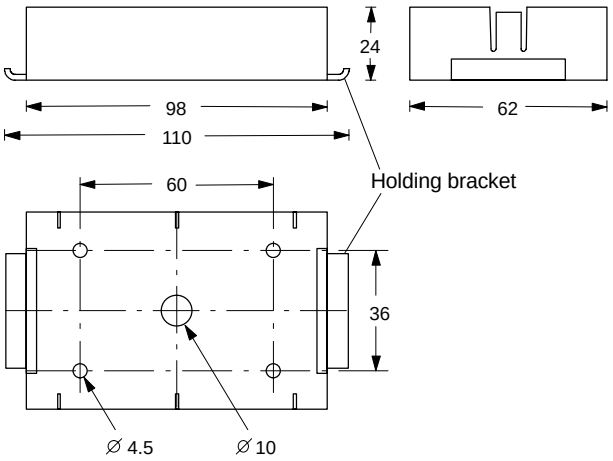
Figure 4-6 Metal-free space for MDS E611

Note

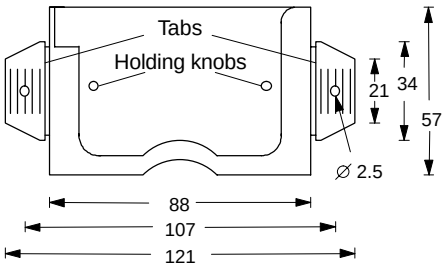
Underranging the standard values a, b and h will significantly reduce the field data. The MDS can be mounted with metal screws (i.e., no significant effect on the range).

Dimensional drawing

Spacer: 6GT2 190-0AA00



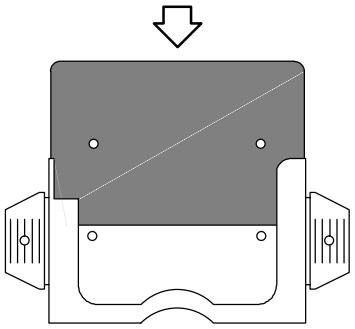
Mounting bracket: 6GT2 190-0AB00



The spacer can be mounted directly on metal. Together with the mounting bracket, this provides a distance of 20 mm between the MDS and metal.

Mounting:
– With 2 or 4 M4 screws
– With rubber pads on the holding brackets (e.g., on mesh boxes)
– With cable binders on the holding brackets (e.g., on mesh boxes)

MDS with mounting bracket

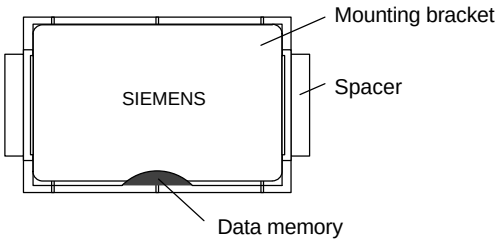


The MDS is slid into the mounting bracket. The knobs lock the MDS into the mounting bracket.

The tabs of the mounting bracket are secured to a non-metal base as listed below.
- Screws in the holes provided
- Rivets in the holes provided
- Nails through the holes
- Staples through the plastic of the tabs
- Insertion in the spacer

The tabs can also be bent by 90°.

MDS with mounting bracket and spacer (assembled)



Assembly:
Slide MDS into mounting bracket. Bend tabs by 90°, and insert into spacer. Position the mounting bracket so that it covers the MDS as shown in the figure. It is automatically locked into place.

Figure 4-7 Dimensions of the spacer and mounting bracket for the MDS E611 (For use with MDS E600, see note in figure 4-2.)

4.4 MDS E623

The MDS E623 was constructed for tool coding in accordance with DIN 69873. It can be used everywhere where small data carriers and precise positioning are required (e.g., tool identification).

Ordering data

Table 4-9 Ordering data for MDS E623

	Order No.
MDS E623 mobile data memory	6GT2 300-0CD00

Figure 4-8 MDS E623

Technical data

Table 4-10 Technical data of MDS E623

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at 40° C)	2.5 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200,000
Typical write cycles	1,000,000
Data retention time (at < +40° C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	20 g
Shock	100 g
Torsion and bending stress	Not permitted
Mounting of the MDS	Adhesive[1]; (e.g., Araldit AW2101/HW2951 or 2021; UHU-Plus endfest 300)
Protection rating • In acc. with EN 60529 • In acc. with DIN 40050 (part 9)	 IP 67 IP x9K (steam jet: 150 mm; 10 to 15 l/min; 75° C)

Table 4-10 Technical data of MDS E623

Physical layout	Molded, shock-resistant plastic
Color	Black
Material	Epoxy resin
Dimensions	∅ 10 x 4.5
(Dimensions and tolerances in acc. w. DIN 69873)	(Heel on bottom 0.5 x 45°)
Ambient temperature	
During operation	–25° to +85° C
During transportation and storage	–40° to +100° C
Weight, approximate	4 g

1 The processing specifications of the manufacturer must be adhered to.

Field data

Table 4-11 Field data MDS E623

	SLG 70 ANT 0	**SIM 70 ANT 0**	**SLG 75 ANT 12**
Metal-free installation (static)			
Operating distance (S_a)	0 to 6 mm	0 to 6 mm	0 to 4 mm
Transmission window (L_d)	4 mm (average deviation ±2 mm)	4 mm (average deviation ±2 mm)	8 mm (average deviation ±4 mm)
Limit distance (S_g)	6 mm	6 mm	5 mm
Flush mounting in metal (static)			
Operating distance (S_a)	0 to 3.5 mm	0 to 3.5 mm	0 to 3 mm
Transmission window (L_d)	4 mm (average deviation ±1.5 mm)	4 mm (average deviation ±1.5 mm)	4 mm (average deviation ±2 mm)
Limit distance (S_g)	4 mm	4 mm	4 mm
Minimum distance from MDS to MDS	> 30 mm	> 30 mm	> 20 mm

Note

The MDS E623 is only designed for static operation.

Metal-free space

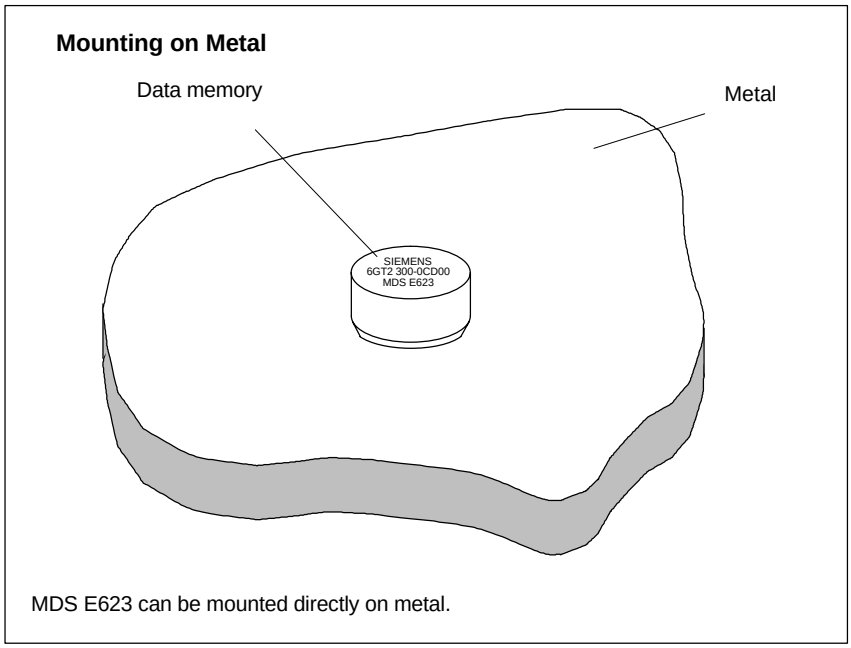


Figure 4-9 Mounting on metal: MDS E623

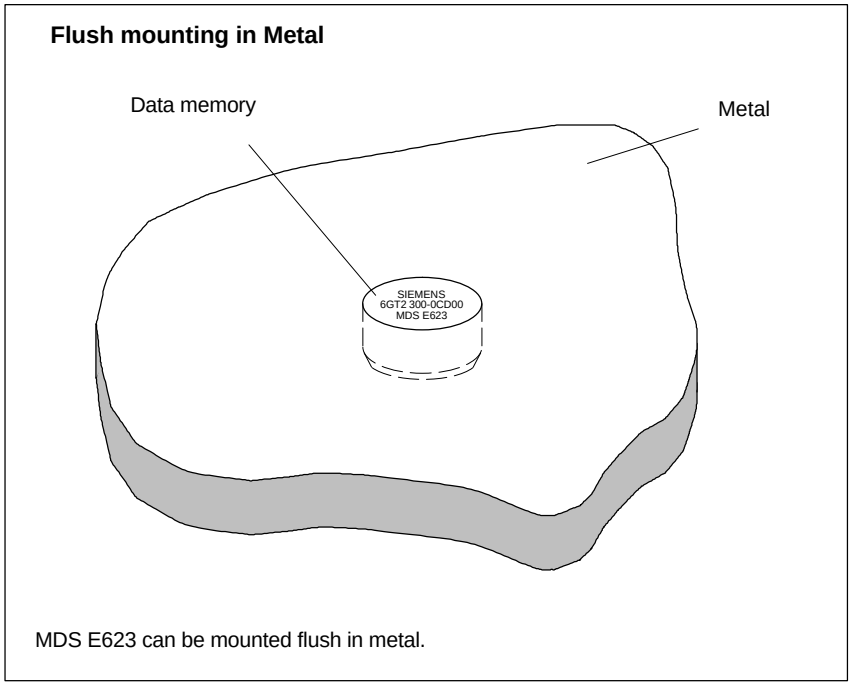


Figure 4-10 Metal-free space for MDS E623

Mounting the MDS E623 flush in metal for tools

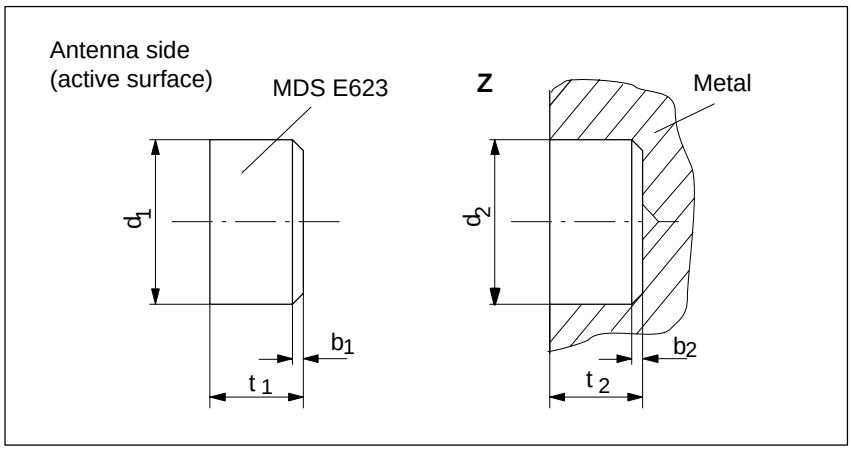


Figure 4-11 Dimensions and mounting space for MDS E623

Table 4-12 Dimensions of MDS E623/mounting space in acc. w. DIN 69873

	MDS E623		**Einbauraum**
b_1	0.5 x 45°	b_2	0.3 x 45° or R 0.3
d_1	$10^{-0.04}_{-0.13}$	d_2	$10^{+0.09}_{0}$
t_1	$4.5^{-0}_{-0.1}$	t_2	$4.6^{+0.2}_{0}$

The MDS may not protrude out of the receptacle hole. It must be flush with the outside contours. When installing, follow the mounting instructions of the MDS and take into account the particular conditions of your project (e.g., scope speed, temperature and use of cooling lubricant).

Mounting with adhesive

- Bore mounting opening
- The surface to which adhesive will be applied must be dry and free of dust, grease, stripping agents and other soil.
- Apply adhesive in accordance with the manufacturer's instructions.
- Press MDS E623 in by hand. Antenna side to outside (see figure 4-11).
- Remove extra adhesive.
- Allow to harden in accordance with the instructions of the adhesive manufacturer.

Examples of mounting

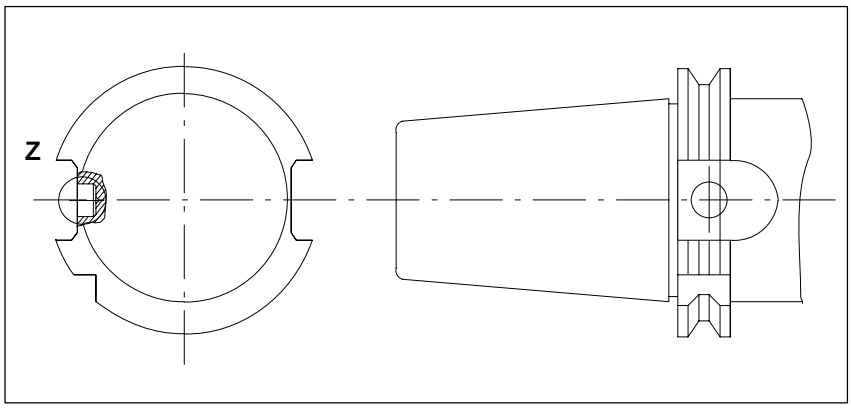


Figure 4-12 Example of mounting the MDS E623 in a quick-release taper shaft

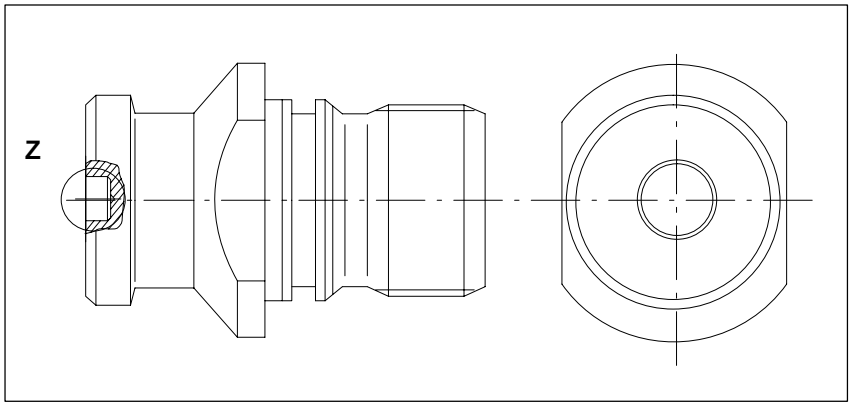


Figure 4-13 Example of mounting the MDS E623 in a retention shaft

4.5 MDS E624

Ordering data

Table 4-13 Ordering data for MDS E624

	Order No.
MDS E624 mobile data memory with 752-byte EEPROM	6GT2 300-0CE00

Figure 4-14 MDS E624

Technical data

Table 4-14 Technical data of MDS E624

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at 40° C)	2.5 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200,000
Typical write cycles	1,000,000
Data retention time (at < +40° C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	20 g
Shock	100 g
Torsion and bending stress	Not permitted
Mounting of the MDS	Adhesive/M3 screw
Tightening moment at +20° C	≤ 1 Nm
Protection rating • In acc. with EN 60529 • In acc. with DIN 40050 (part 9)	 IP 67 IP x9K (steam jet: 150 mm; 10 to 15 l/min; 75° C)
Physical layout Color Material	Shock-resistant, molded plastic Black Epoxy resin

Table 4-14 Technical data of MDS E624

Dimensions (D x H) in mm	27 x 4
Ambient temperature	
During operation	–25° to +125° C
During transportation and storage	–40° to +150° C
Weight, approximate	5 g

Field data

Table 4-15 Field data of MDS E624

	SLG 70 ANT 0	**SLG 70 ANT 1**	**SLG 72**	**SLG 75 ANT 30**	**SLA 71**
Operating distance (S_a)	0 to 8 mm	0 to 25 mm	0 to 30 mm	0 to 18 mm	0 to 25 mm
Limit distance (S_g)	15 mm	40 mm	40 mm	24 mm	40 mm
Diameter of transmission window (L_d)	12 mm (L_d)	38 mm (L_d)	60 mm (L_x)[1] 40 mm (L_y)[1]	14 mm (L_d)	38 mm (L_d)
Minimum distance from MDS to MDS	> 50 mm	> 250 mm	> 250 mm	> 60 mm	> 250 mm

1 For field geometry, see also figure 5-14.

The field data apply to read and write-accesses of the MDS.

Dimensions (in mm)

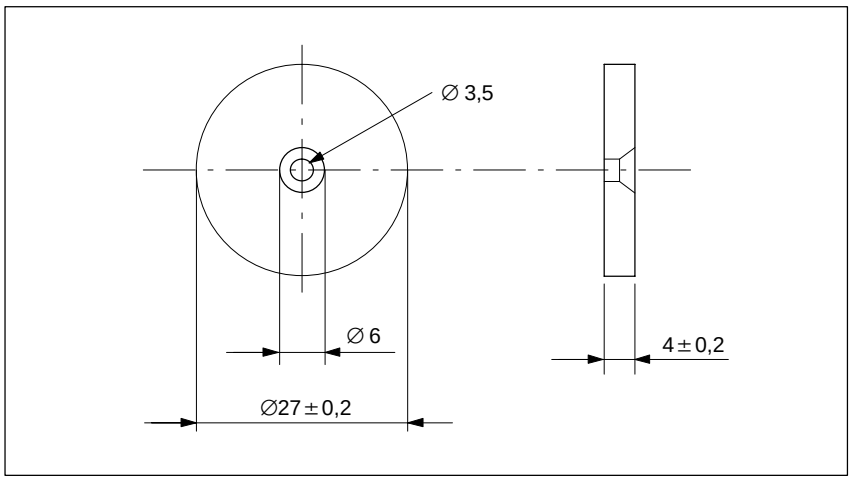


Figure 4-15 Dimensions of MDS E624

Metal-free space

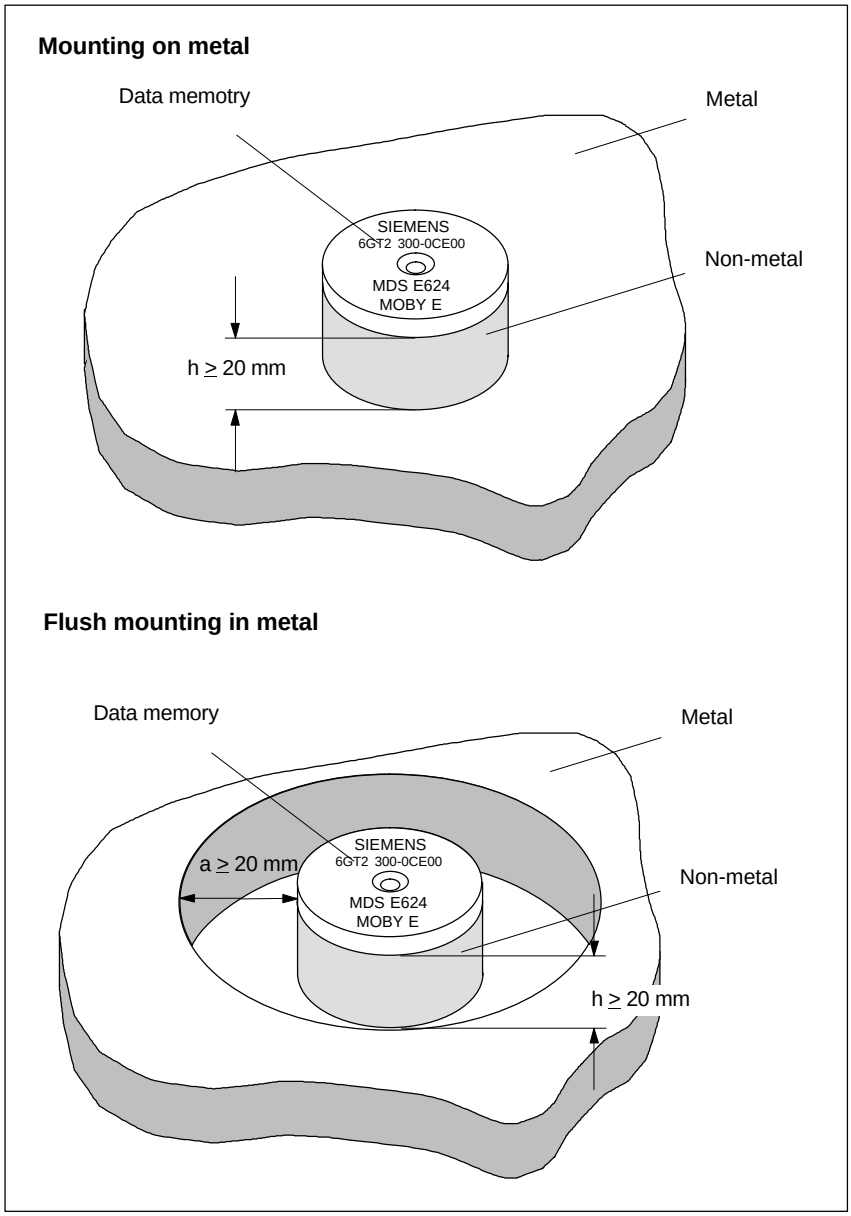


Figure 4-16 Metal-free space for MDS E624

Note

Underranging the standard values a and h will significantly reduce the field data. The MDS can be mounted with M3 countersunk metal screws (i.e., no significant effect on the range).

Read/Write Devices
Read/Write Antennas

5

5.1 Introduction

Application area

The SLGs/SLAs provide inductive communication with the mobile data memories (i.e., MDSs) and the serial link to the interfaces (i.e., ASMs).

Various SLG/SLA models – for short, medium and long distances to the MDS – are available to meet customer requirements.

Layout and functions

The SLG/SLA executes commands received from the interface. These commands for reading and writing data are converted via a modulator/demodulator circuit.

Communication between MDS and SLG/SLA takes place via inductive alternating fields.

The amount of data which can be transferred between SLG/SLA and MDS depends on the factors listed below.

- The speed at which the MDS moves through the transmission window of the SLG/SLA
- The length of the transmission window

Table 5-1 Overview table of SLG/SLA

SLG Type	Operating Distance S_a (Depending on MDS)	Limit Distance S_g	Temperature Range (During Operation)	Circuit Dimensions (L x W x H) in mm	Antenna Dimensions (L x W x H) in mm	Protection Rating
SLG 70 ANT 0	0 to 8 mm	15 mm	-25° to +70° C	160 x 80 x 40	∅ M18 x 50	IP 65
SLG 70 ANT 1	0 to 70 mm	100 mm	-25° to +70° C	160 x 80 x 40	75 x 75 x 20	IP 65
SLG 72	0 to 70 mm	100 mm	-25° to +70° C	160 x 80 x 40	---	IP 65
SLG 75 ANT 12	0 to 4 mm	5 mm	-25° to +70° C	160 x 80 x 40	∅ M12 x 40	IP 65
SLG 75 ANT 30	0 to 18 mm	24 mm	-25° to +70° C	160 x 80 x 40	∅ M30 x 58	IP 65
SLA 71	0 to 70 mm	100 mm	-20° to +70° C	---	75 x 75 x 20	IP 65

1 **Definition of IP 65**
- Protection against penetration of dust (i.e., dust-proof)
- Full protection against touch
- Protection against water jet

5.2 SLG 70 ANT 0

Application area

The SLG 70 ANT 0 is extremely suited to use in small assembly lines. The short installation distance between several SLG 70 ANT 0 antennas is a special feature. With the 2 screw nuts, the antenna head can be positioned with extreme precision for each application.

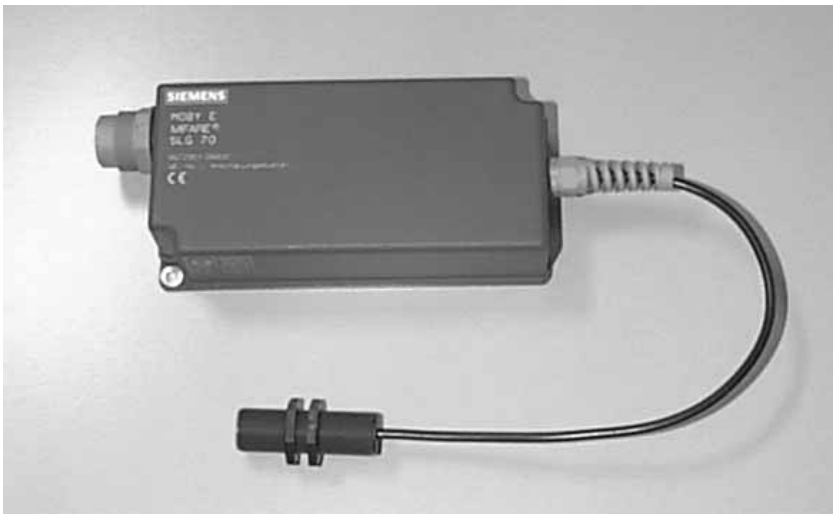


Figure 5-1 Read/write device SLG 70 ANT 0

Ordering data

Table 5-2 Ordering data of SLG 70 ANT 0

Read/write device SLG 70 ANT 0	6GT2 301-0AA00
SLG plug connector and plug-in line	See chapter 7.8

Technical data

Table 5-3 Technical data of SLG 70 ANT 0

Inductive interface to MDS	
Max. SLG-MDS read/write distances	15 mm. See field data.
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	19200 Baud
Max. ASM-SLG cable length (at 24 V DC and line cross section of 0.2 mm^2)	120 m
Max. data cable length. See cable configuration in table 3-14.	1000 m
Max. antenna cable length	0.45 m

Table 5-3 Technical data of SLG 70 ANT 0

Supply voltage (via serial interface)		
Nominal value		24 V DC
Permissible range		20 to 30 V DC
Current consumption		
Brief switch-on current		700 mA (max.)
Operation (at 24 V)		180 mA (typ.)
MTBF (at +40° C)		2.5 x 10^5 hours
Housing		
Dimensions (in mm)		
For antenna head (∅ x thread x L)		M18 x 1.5 x 50
For electronics without plug connector (L x W x H)		160 x 80 x 40
Color	Antenna	Anthracite with orange head
	SLG housing	Anthracite
Material	Antenna	"Crastin"
	SLG housing	Polyamide 12
Plug connection		6-pin SLG plug connection in acc. w. DIN 43651
Protection rating in acc. w. EN 60529		
SLG housing		IP 65
Antenna		IP 67 (front)
Shock in acc. w. EN 60721-3-7, class 7M2		30 g[1]
Total shock response spectrum, type II		
Vibration in acc. w. EN 60721-3-7, class 7M2		1 g (9 to 200 Hz)[1]
		1.5 g (200 to 500 Hz)[1]
Mounting of SLG		2 M5 screws
Turning moment at room temperature		
Mounting of antenna		2 plastic nuts (M18 x 1.5)
Ambient temperature		
During operation		-25° to +70° C
During transportation and storage		-40° to +85° C
Weight, approximate		510 g

1 **Warning:** The values for shock and vibration are maximum values and may not occur continuosly.

Field data

Table 5-4 Field data of SLG 70 ANT 0

Operating distance (S_a)	0 to 8 mm
Limit distance (S_g)	15 mm
Transmission window	Depends on MDS
Minimum distance from SLG to MDS (D)	$D_a \geq$ 200 mm $D_b \geq$ 200 mm

Transmission window

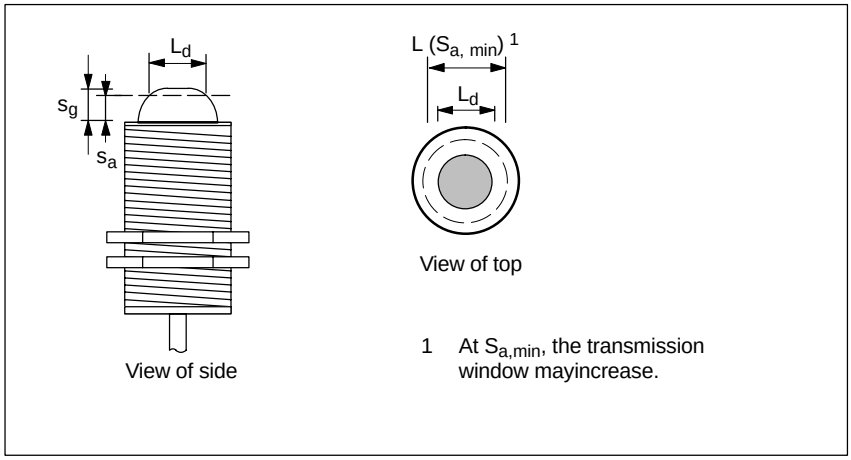


Figure 5-2 Transmission window of SLG 70 ANT 0

Transmission window:

To ensure reliable data communication, the antenna of the MDS must be positioned within this field.

Metal-free space

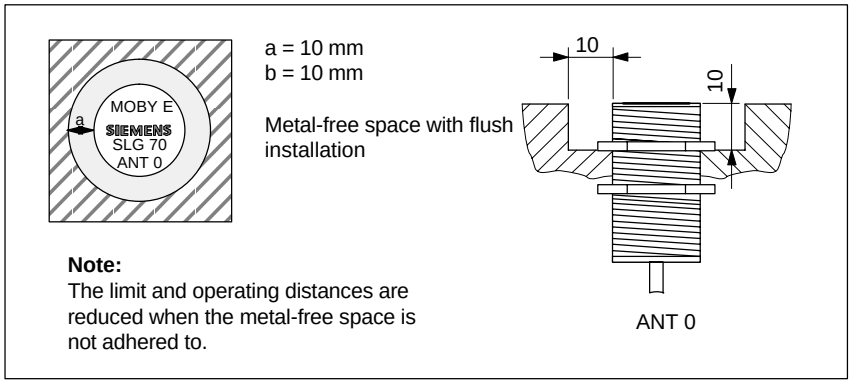


Figure 5-3 Metal-free space for SLG 70 ANT 0

FCC information

Made in Germany

SIEMENS MOBY E SLG 70 ANT 0

FCC ID: NXWMOBYE-SLG70ANT0

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES: OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of distance D

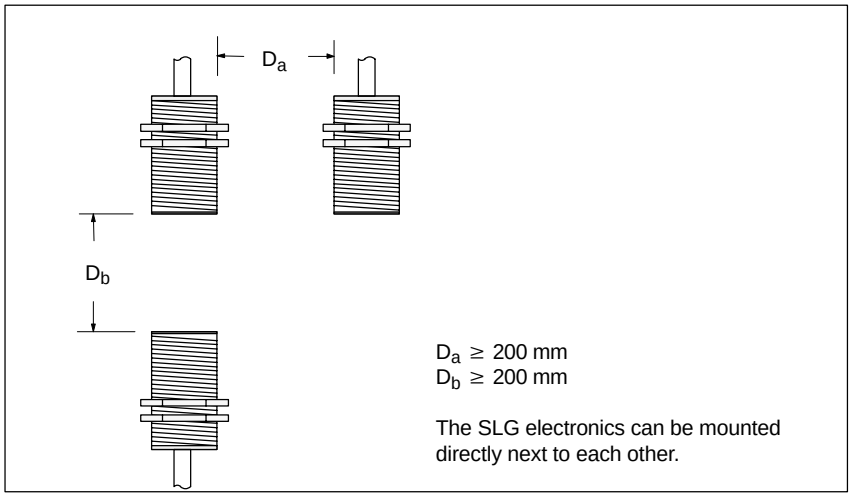


Figure 5-4 Distance D: SLG 70 ANT 0

Dimensions (in mm)

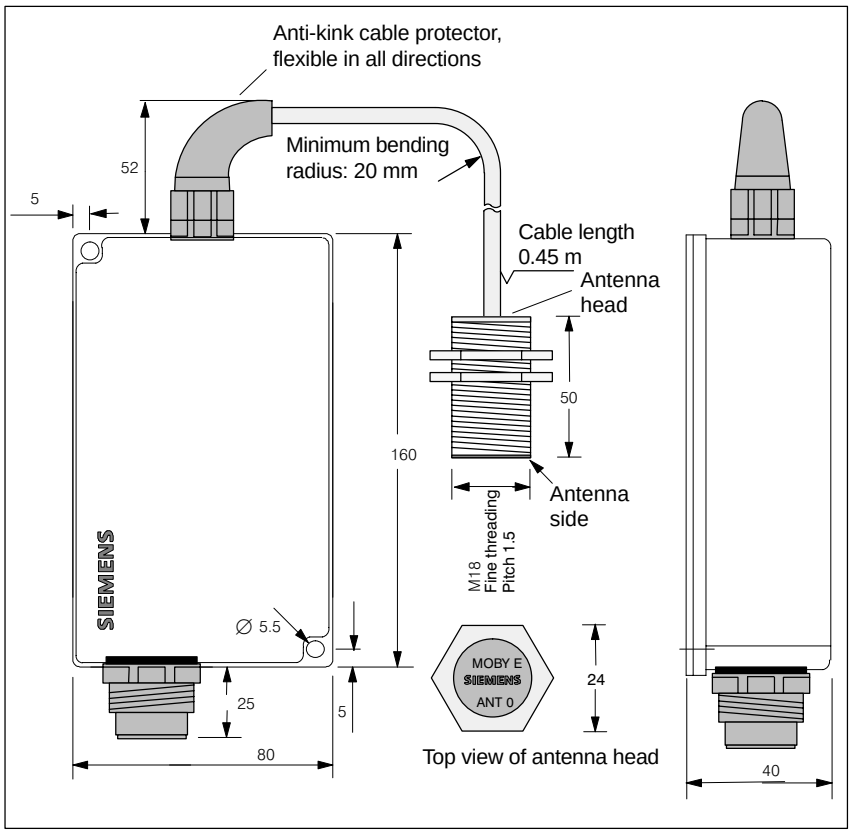


Figure 5-5 Dimensional diagram of SLG 70 ANT 0

5.3 SLG 70 ANT 1

Application area

The SLG 70 ANT 1 is a read/write device in the medium performance range. Since its antenna is larger, the SLG 70 ANT 1 creates a much larger field than the SLG 70 ANT 0, and a wider range can be achieved with the same data memories. During dynamic operation, the MDS can read/write more data. See chapter 3.3.

Figure 5-6 SLG 70 ANT 1 read/write device

Ordering data

Table 5-5 Ordering data of SLG 70 ANT 1

Read/write device SLG 70 ANT 1	6GT2 301-0AB00
SLG plug connector and plug-in line	See chapter 7.8

Technical data

Table 5-6 Technical data of SLG 70 ANT 1

Inductive interface to MDS	
Read/write distance SLG to MDS (max.)	10 mm (see field data)
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	19200 Baud
Max. ASM-SLG cable length (at 24 V DC and line cross section of 0.2 mm^2)	120 m
Max. data cable length. See cable configuration in table 3-14.	1000 m
Max. antenna cable length	0.45 m

Table 5-6 Technical data of SLG 70 ANT 1

Supply voltage (via serial interface)		
Nominal value		24 V DC
Permissible range		20 to 30 V DC
Current consumption		
Brief switch-on current		700 mA (max.)
Operation (at 24 V)		180 mA (typ.)
MTBF (at +40° C)		2.5 x 10^5 hours
Housing		
Dimensions (in mm)		
For antenna head (W x H x D)		75 x 75 x 20
For electronics w/o plug (W x H x D)		160 x 80 x 40
Color	Antenna	Anthracite
	SLG housing	Anthracite
Material	Antenna	Polyamide 12
	SLG housing	Polyamide 12
Plug connection		6-pin SLG plug connection in acc. w. DIN 43651
Protection rating in acc. w. EN 60529		
SLG housing		IP 65
Antenna		IP 67
Shock in acc. w. EN 60721-3-7, class 7M2 Total shock response spectrum, type II		30 g[1]
Vibration in acc. w. EN 60721-3-7, class 7M2		1 g (9 to 200 Hz)[1] 1.5 g (200 to 500 Hz)[1]
Mounting of SLG		2 M5 screws
Mounting of antenna		2 M5 screws
Turning moment at room temperature		≤ 2 Nm
Ambient temperature		
During operation		-25° to +70° C
During transportation and storage		-40° to +85° C
Weight (approx.)		620 g

1 **Warning:** The values for shock and vibration are maximum values and may not occur continuosly.

Field data

Table 5-7 Field data of SLG 70 ANT 1

Operating distance (S_a)	10 to 70 mm
Limit distance (S_g)	100 mm
Median deviation (L_d)	Depends on MDS
Minimum distance from SLG to SLG (D)	D_a > 800 mm D_b > 800 mm

Transmission window

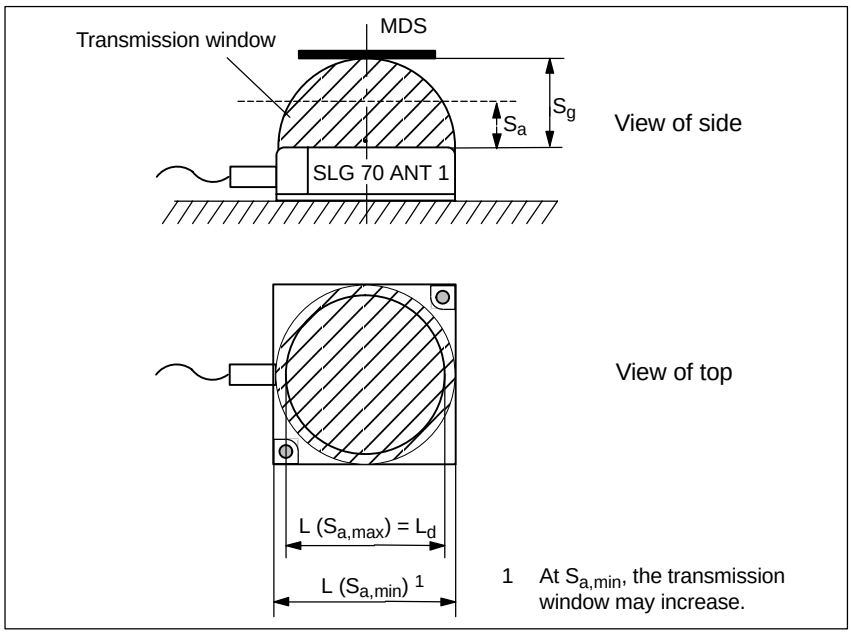


Figure 5-7 Transmission window of SLG 70 ANT 1

Metal-free space

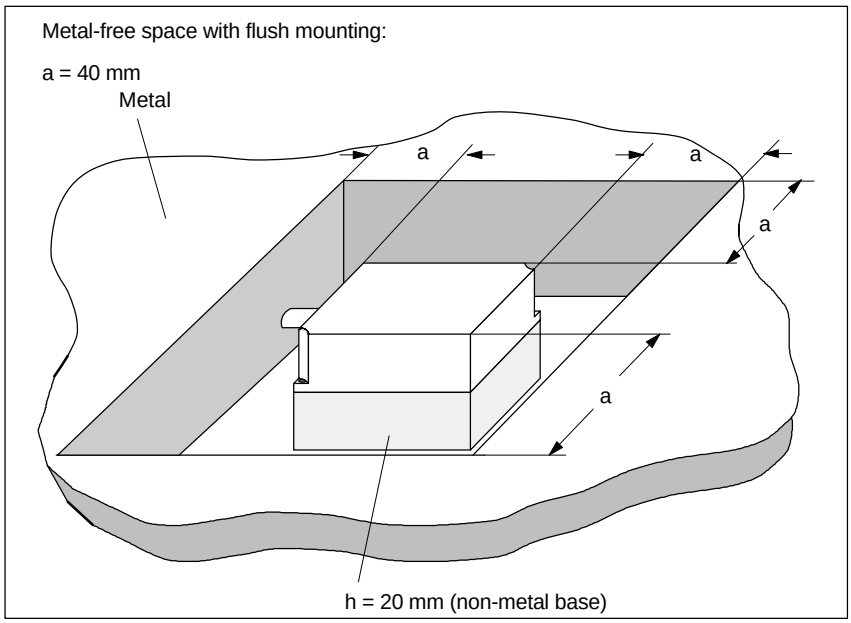


Figure 5-8 Metal-free space of SLG 70 ANT 1

FCC information

Made in Germany

SIEMENS MOBY E SLG 70 ANT 1

FCC ID: NXWMOBYE-SLG70ANT1

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES: OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of distance D

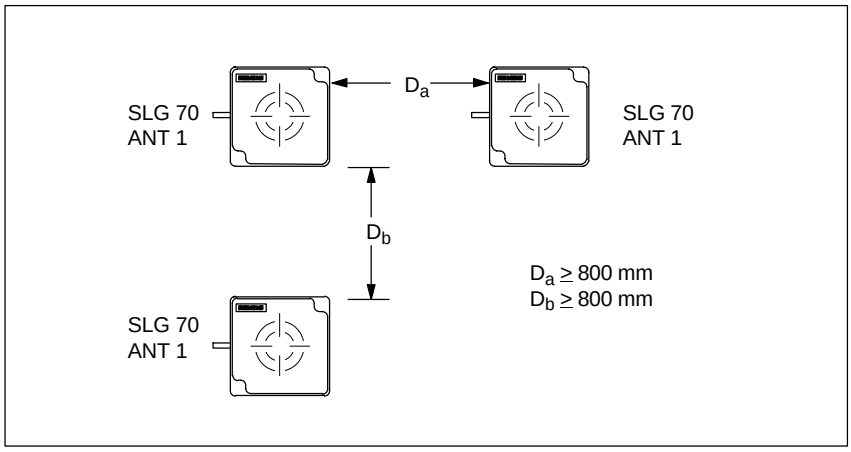


Figure 5-9 Distance D for: SLG 70 ANT 1

Dimensions (in mm)

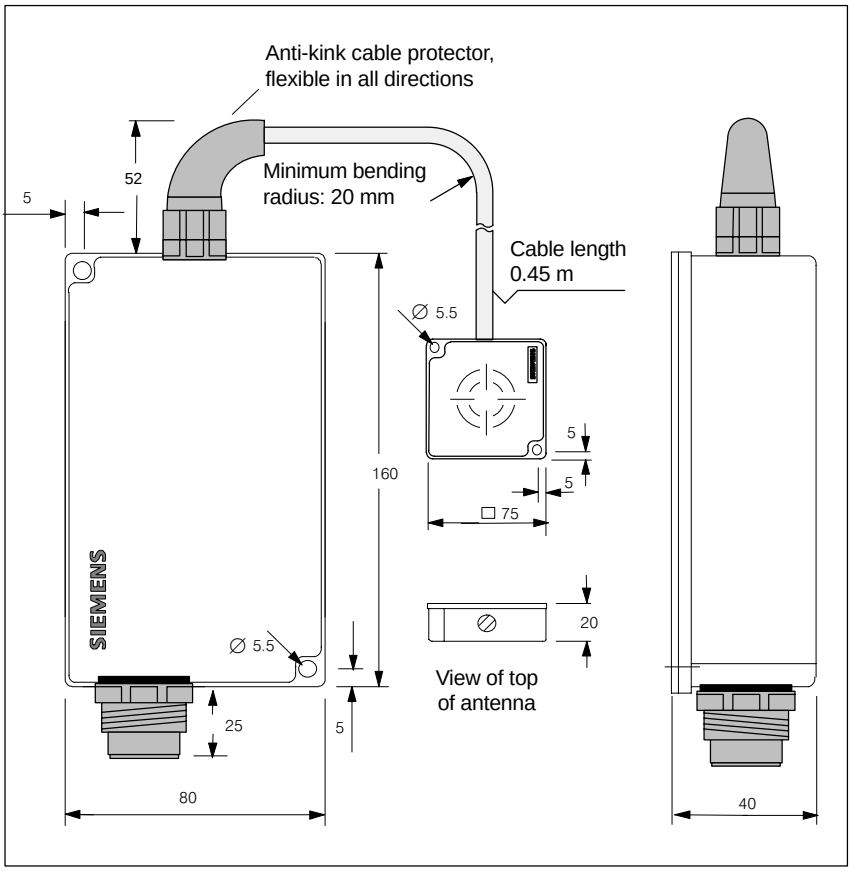


Figure 5-10 Dimensional diagram of SLG 70 ANT 1

5.4 SLG 72

Application area

The SLG 72 is a read/write device in the medium performance range. Since its antenna is larger, the SLG 72 creates a larger field than the SLG 70 ANT 1. During dynamic operation, the MDS can read/write more data. See chapter 3.3.

Figure 5-11 SLG 72 read/write device

Ordering data

Table 5-8 Ordering data of SLG 72

Read/write device SLG 72	6GT2 301-0CA00
SLG plug connector and plug-in line	See chapter 7.8

Technical data

Table 5-9 Technical data of SLG 72

Inductive interface to MDS	
Read/write distance SLG to MDS (max.)	10 mm (see field data)
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	19200 Baud
Max. ASM-SLG cable length (at 24 V DC and line cross section of 0.2 mm^2)	120 m
Max. data cable length. See cable configuration in table 3-14.	1000 m

Table 5-9 Technical data of SLG 72

Supply voltage (via serial interface)	
Nominal value	24 V DC
Permissible range	20 to 30 V DC
Current consumption	
Brief switch-on current	700 mA (max.)
Operation (at 24 V)	180 mA (typ.)
MTBF (at +40° C)	2.5 x 10^5 hours
Housing	
Dimensions (in mm)	
Without plug (W x H x D)	160 x 80 x 40
Color	Anthracite
Material	Polyamide 12
Plug connection	6-pin SLG plug connection in acc. w. DIN 43651
Protection rating in acc. w. EN 60529	IP 65
Shock in acc. w. EN 60721-3-7, class 7M2	30 g[1]
Total shock response spectrum, type II	
Vibration in acc. w. EN 60721-3-7, class 7M2	1 g (9 to 200 Hz)[1] 1.5 g (200 to 500 Hz)[1]
Mounting of SLG	2 M5 screws
Turning moment at room temperature	≤ 2 Nm
Ambient temperature	
During operation	-25° to +70° C
During transportation and storage	-40° to +85° C
Weight (approx.)	550 g

1 **Warning:** The values for shock and vibration are maximum values and may not occur continuosly.

Field data

The exact field data are dependent on the type of MDS used.

Table 5-10 Field data of SLG 72

Operating distance (S_a)	0 to 70 mm
Limit distance (S_g)	100 mm
Median deviation (L)	Depends on MDS
Minimum distance from SLG to SLG (D)	D_a > 800 mm D_b > 800 mm

Definition of distance D

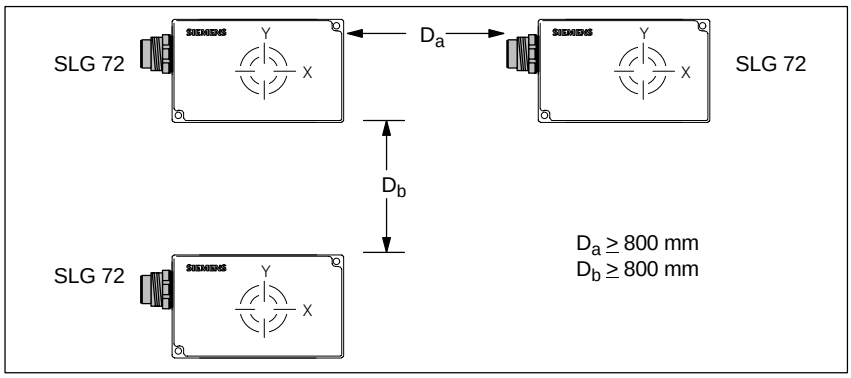


Figure 5-12 Distance D: for SLG 72

Dimensions (in mm)

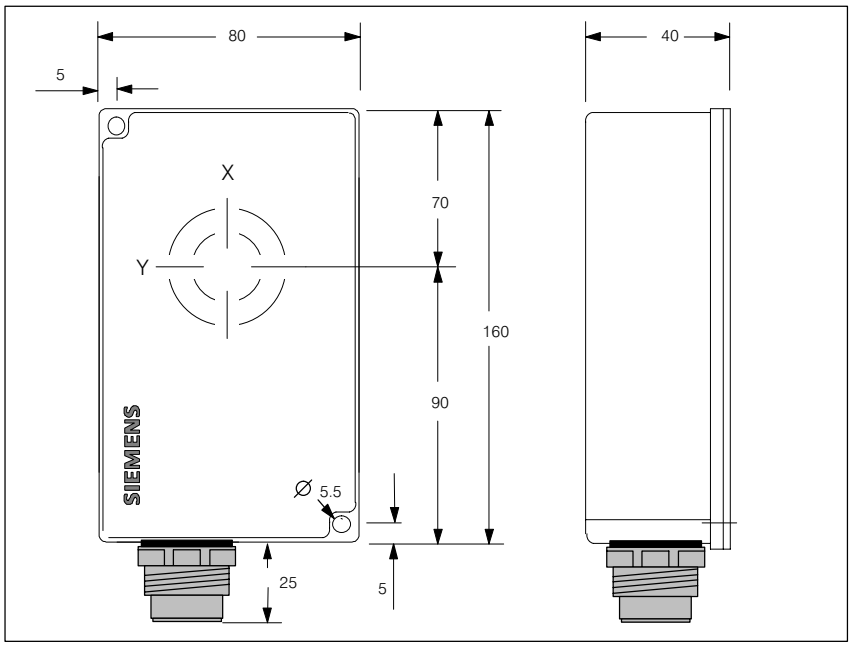


Figure 5-13 Dimensional diagram of SLG 72

FCC information

Made in Germany

SIEMENS MOBY E SLG 72

FCC ID: NXWMOBYE-SLG72

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES: OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Transmission window

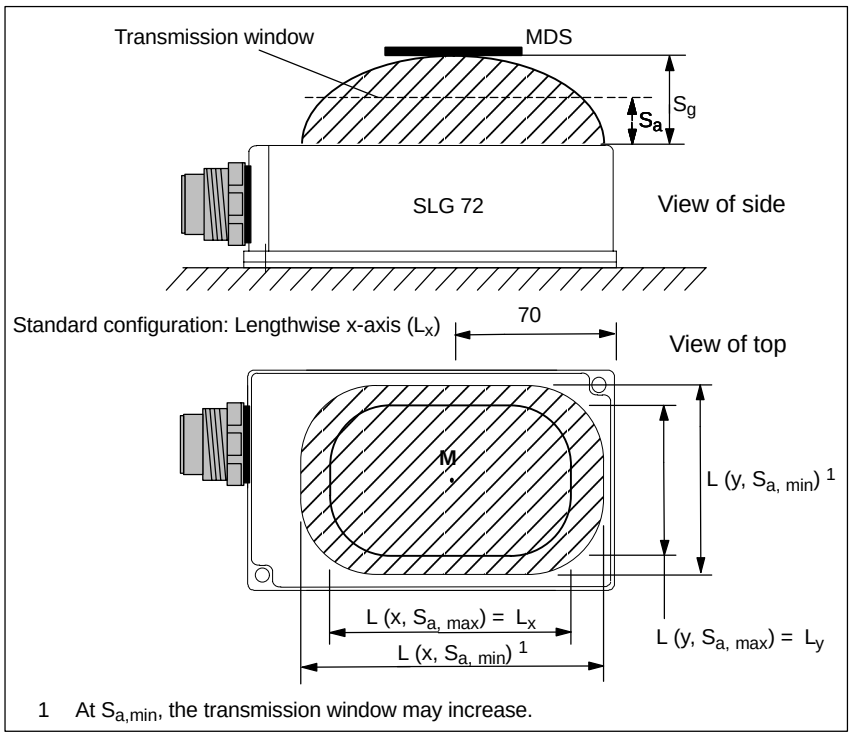


Figure 5-14 Transmission window of SLG 72

Metal-free space

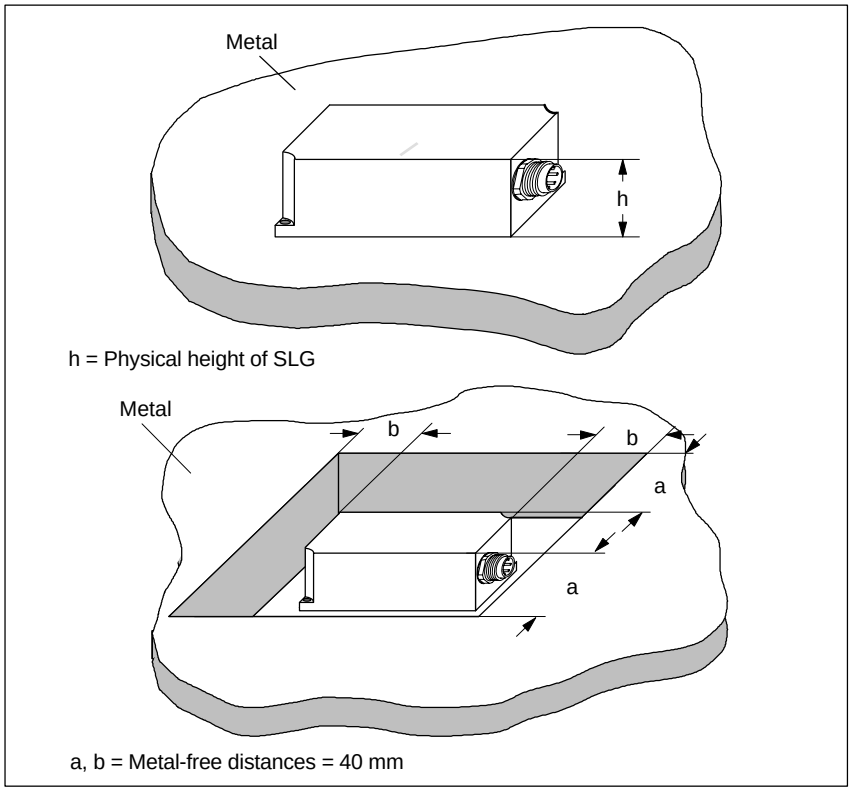


Figure 5-15 Metal-free space of SLG 72

5.5 SLG 75 ANT 12

Application area

The SLG 75 ANT 12 is designed for tool identification. The small, compact antenna permits precise positioning with the included plastic nuts.
The cable between the antenna and evaluation unit is 3 m long. The length cannot be changed. The antenna cable can be connected on the electronics side. The SLG 75 ANT 12 can be operated on the following interfaces: ASM 400, ASM 410, ASM 420, ASM 450 and ASM 470.
Communication with the data carrier is only possible in static mode with the MDS E623 (tool pill).

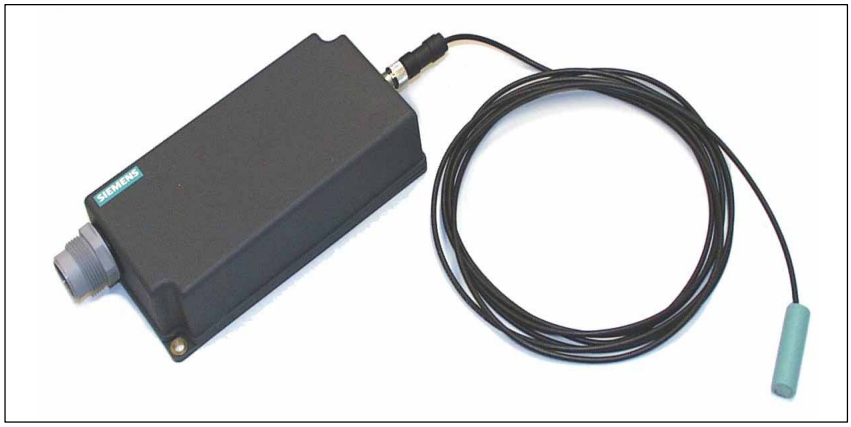


Figure 5-16 Read/write device SLG 75 ANT 12

Ordering data

Table 5-11 Ordering data for the SLG 75 ANT 12

Read/write device SLG 75 ANT 12	6GT2 301-0FC00
SLG plug connector and stub lines	See chap. 7.8.

Technical data

Table 5-12 Technical data of the SLG 75 ANT 12

Inductive interface to MDS	
Read/write distances (SLG - MDS), max.	5 mm (S_g to MDS E623)
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	19200 Baud
Line length (ASM - SLG), max. (for 24 V DC and line cross section of 0.2 mm^2)	120 m
Max. data line length (see table 3-14, cable configuration)	1000 m

Table 5-12 Technical data of the SLG 75 ANT 12

Antenna line length	3 m (can be connected on electronics side)
MDS addressing Commands	Direct access via addresses Initialize MDS, read data from MDS, write data to MDS
Voltage (via serial interface)	
Nominal value Permissible range	24 V DC 20 to 30 V DC
Current consumption	
Switch-on current (brief) Operation (at 24 V DC)	Max. of 700 mA 180 mA (typical)
MTBF (at +40° C)	2.5 x 10^5 hours
Housing	
Dimensions (in mm)	
Antenna head (∅ x weight x length)	M12 x 1.5 x 40
Electronics w/o plug connectors (L x W x H)	160 x 80 x 40
Color (antenna) (SLG housing)	Pastel turquoise Anthracite
Material (antenna) (SLG housing)	Crastin Polyamide 12
Plug connection	
Data	6-pin, SLG plug connector in acc. w. DIN 43651 (pin, device side)
Antenna	4-pin on SLG housing
Protection rating in acc. w. EN 60529	
SLG housing	IP 65
Antenna	IP 67 (front)
Shock in acc. w. EN 60721-3-7/class 7M2	30 g[1]
Vibration in acc. w. EN 60721-3-7/ class 7M2	1 g (3 to 200 Hz)[1] 1.5 g (200 to 500 Hz)[1]
Mounting of the SLG	2 M5 screws
Mounting of antenna	2 plastic nuts M12 x 1.5
Tightening moment at 20° C	≤ 3 Nm
Ambient temperature	
Operation Transportation and storage	-25°to + 70° C -40°to + 85° C
Weight (approx.)	520 g
Certification	CE

1 **Warning:** The values for shock and vibration are maximum values. These values may not occur on a regular basis.

Field data

Table 5-13 Field data of SLG 75 ANT 12

Working distance (S_a)	0 to 4 mm
Limit distance (S_g)	5 mm
Diameter of transmission window (L_d)	8 mm
Minimum distance from SLG to SLG (D)	> 80 mm

Transmission window

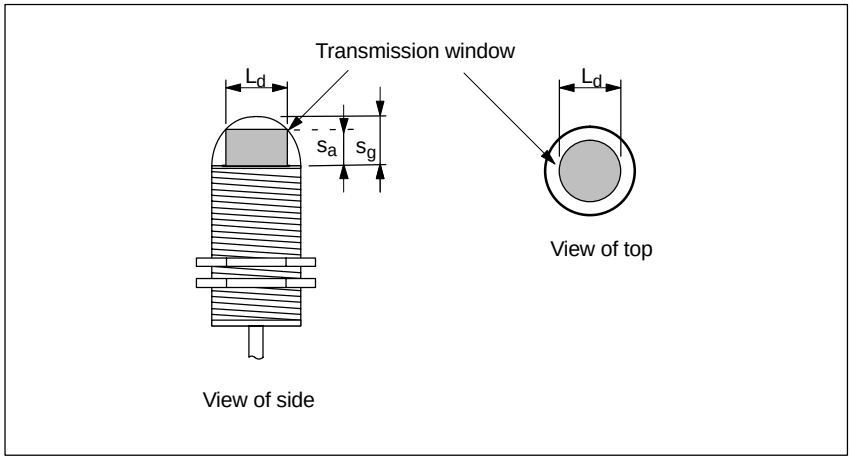


Figure 5-17 Transmission window of SLG 75 ANT 12

Transmission window:
The antenna of the MDS must be positioned inside this field to ensure reliable data communication.

Metal-free space

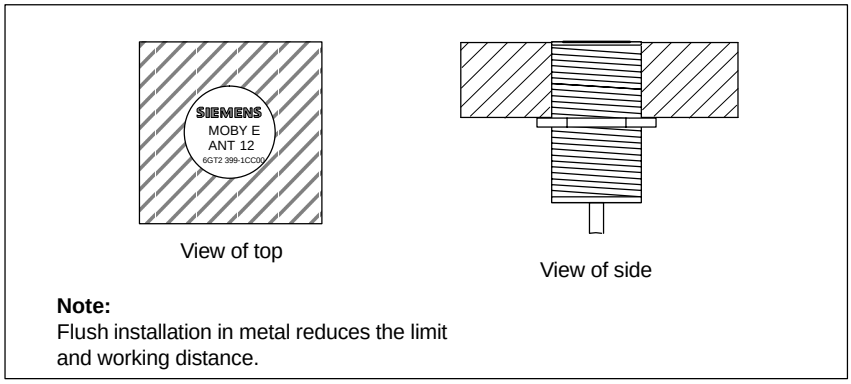


Figure 5-18 Metal-free space for SLG 75 ANT 12

Definition of distance D

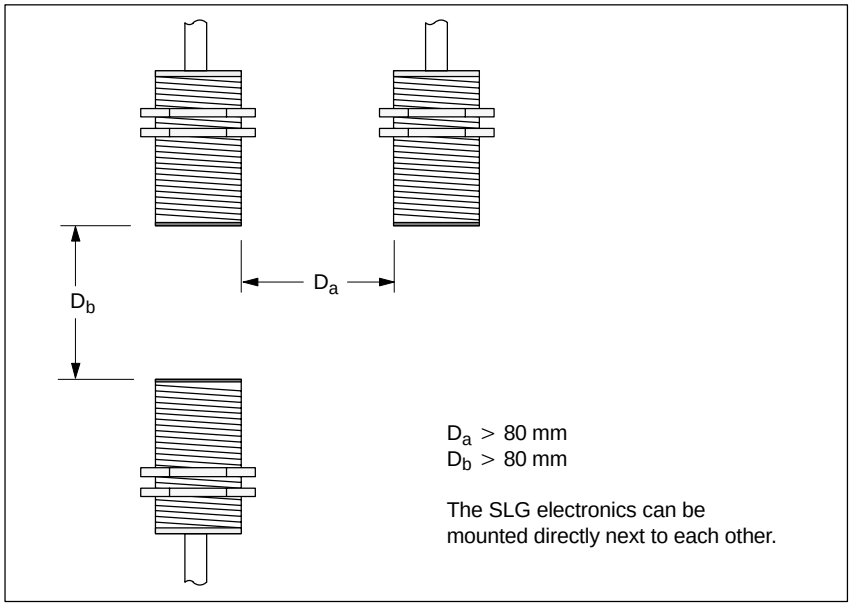


Figure 5-19 Distance D: SLG 75 ANT 12

Dimensions (in mm)

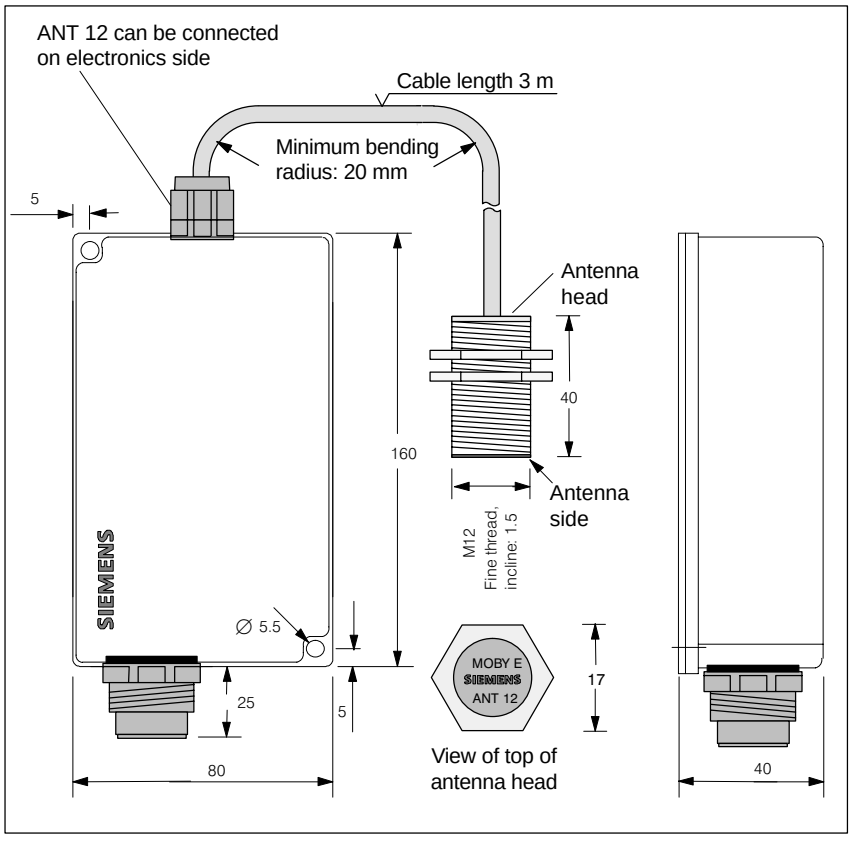


Figure 5-20 Dimensional drawing of SLG 75 ANT 12

5.6 SLG 75 ANT 30

Application area

The SLG 75 ANT 30 is designed for use in production plants and assembly lines. Its remote antenna permits greater distances to the evaluation unit. The antenna can be positioned very easily for all applications with two plastic nuts (included). The length of the line between antenna and evaluation unit is 3 m. The length cannot be changed. The antenna cable can be connected on the electronics side.
The SLG 75 ANT 30 can be operated on the following interfaces: ASM 400, ASM 410, ASM 420, ASM 450 and ASM 470.
Communication with the data carrier is only possible in static mode with the MDS E624.

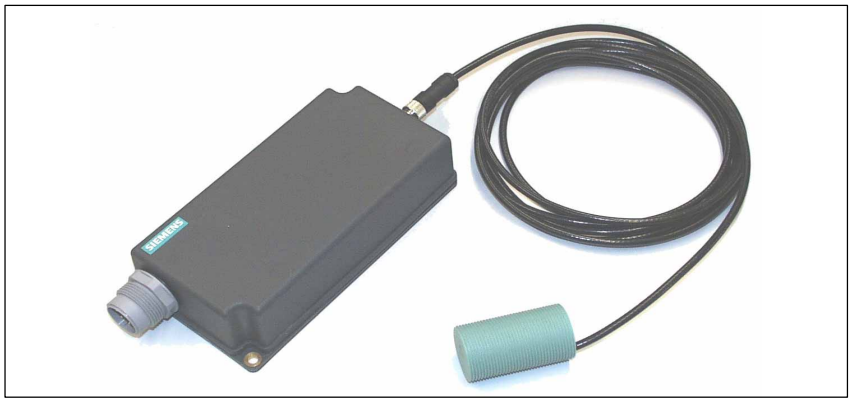


Figure 5-21 Read/write device SLG 75 ANT 30

Ordering data

Table 5-14 Ordering data for the SLG 75 ANT 30

Read/write device SLG 75 ANT 30	6GT2 301-0FD00
SLG plug connector and stub lines	See chap. 7.8.

Technical data

Table 5-15 Technical data of the SLG 75 ANT 30

Inductive interface to MDS	
Read/write distances (SLG - MDS), max.	24 mm (S_g to MDS E624)
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	19200 Baud
Line length (ASM - SLG), max. (for 24 V DC and line cross section of 0.2 mm^2)	120 m
Max. data line length (see table 3-14, cable configuration)	1000 m

Table 5-15 Technical data of the SLG 75 ANT 30

Antenna line length	3 m (can be connected on electronics side)
MDS addressing Commands	Direct access via addresses Initialize MDS, read data from MDS, write data to MDS
Voltage (via serial interface)	
Nominal value Permissible range	24 V DC 20 to 30 V DC
Current consumption	
Switch-on current (brief) Operation (at 24 V DC)	Max. of 700 mA 180 mA (typical)
MTBF (at +40° C)	2.5 x 10^5 hours
Housing	
Dimensions (in mm)	
Antenna head (∅ x weight x length)	M30 x 1.5 x 58
Electronics w/o plug connectors (L x W x H)	160 x 80 x 40
Color (antenna) (SLG housing)	Pastel turquoise Anthracite
Material (antenna) (SLG housing)	Crastin Polyamide 12
Plug connection	
Data	6-pin, SLG plug connector in acc. w. DIN 43651 (pin, device side)
Antenna	4-pin on SLG housing
Protection rating in acc. w. EN 60529	
SLG housing	IP 65
Antenna	IP 67 (front)
Shock in acc. w. EN 60721-3-7/class 7M2	30 g[1]
Vibration in acc. w. EN 60721-3-7/ class 7M2	1 g (3 to 200 Hz)[1] 1.5 g (200 to 500 Hz)[1]
Mounting of the SLG	2 M5 screws
Mounting of antenna	2 plastic nuts (M12 x 1.5)
Tightening moment at 20° C	≤ 3 Nm
Ambient temperature Operation Transportation and storage	 -25° to + 70° C -40° to + 85° C
Weight (approx.)	520 g
Certification	CE

1 **Warning:** The values for shock and vibration are maximum values. These values may not occur on a regular basis.

Field data

Table 5-16 Field data of SLG 75 ANT 30

Working distance (S_a)	0 to 18 mm
Limit distance (S_g)	24 mm
Diameter of transmission window (L_d)	14 mm
Minimum distance from SLG to SLG (D)	> 125 mm

Transmission window

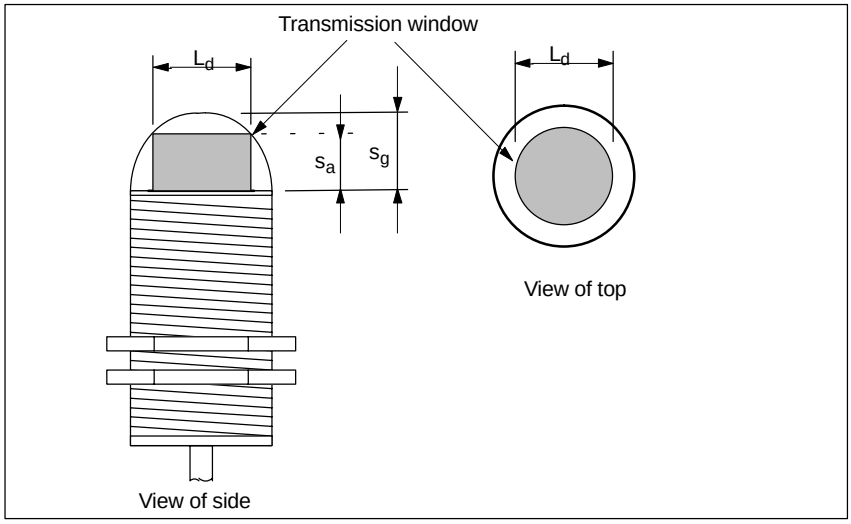


Figure 5-22 Transmission window of SLG 75 ANT 30

Transmission window:
The antenna of the MDS must be positioned inside this field to ensure reliable data communication.

Metal-free space

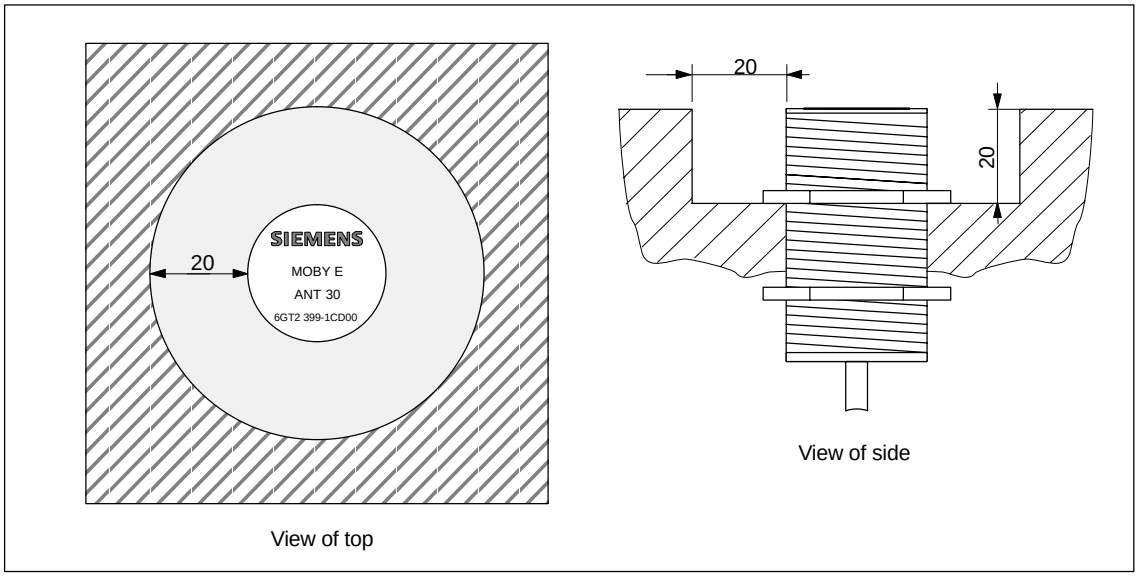


Figure 5-23 Metal-free space for SLG 75 ANT 30

Definition of distance D

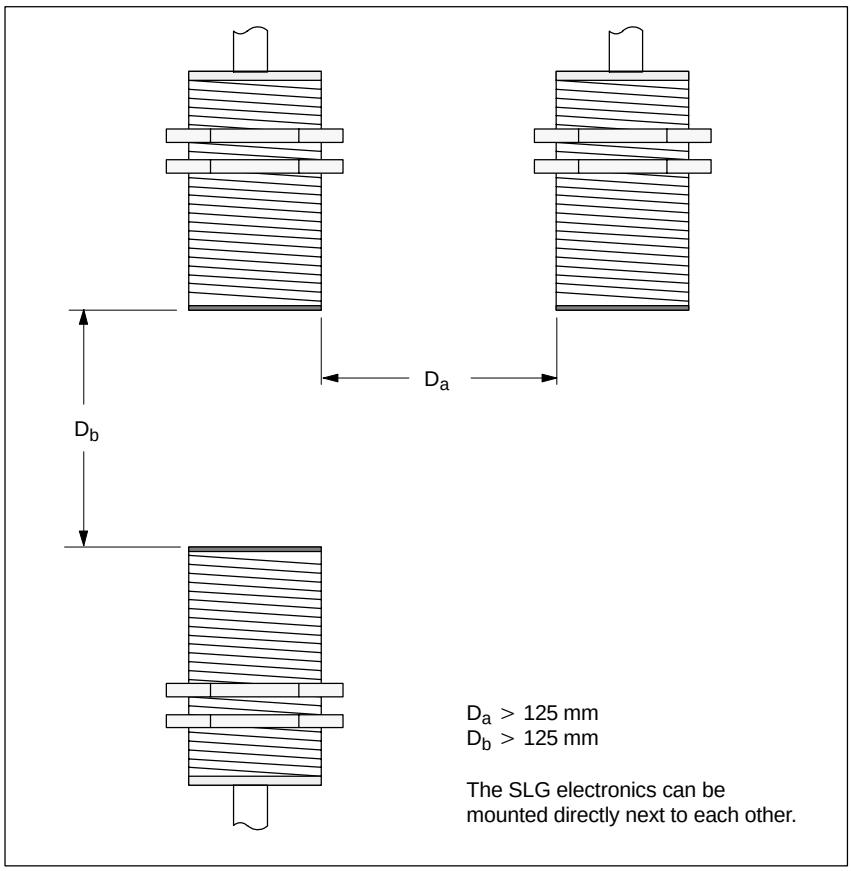


Figure 5-24 Distance D: SLG 75 ANT 30

Dimensions (in mm)

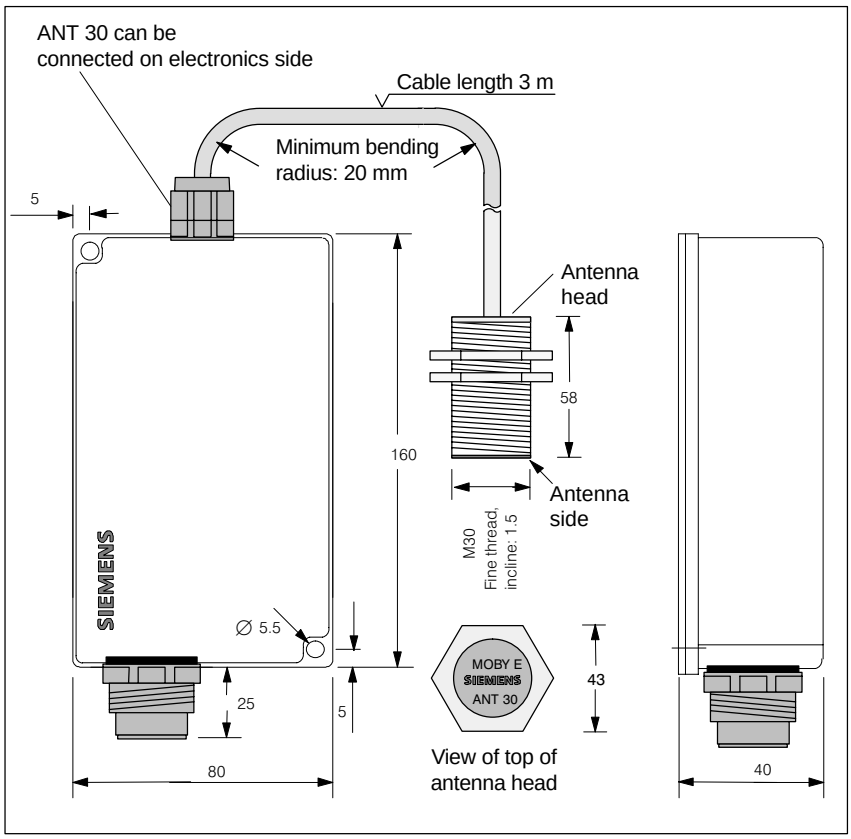


Figure 5-25 Dimensional drawing of SLG 75 ANT 30

5.7 SLA 71

Application area

The SLA 71 is a middle-of-the-line read/write antenna. It permits greater distances to the evaluation unit (ASM).
The length of the line between antenna and evaluation unit is 55 m (max.).
The SLA 71 can be operated on the following interfaces: ASM 724 and ASM 754.

Figure 5-26 Read/write antenna SLA 71

Ordering data

Table 5-17 Ordering data for the SLA 71

Read/write antenna SLA 71	6GT2 301-2BB00
Accessories: Standard connection cable between SLA 71 and ASM 724, and ASM 754; length 5 m (not included with SLA 71) Extension for antenna line 6GT2 391-1AH50; length 25 m	 6GT2 391-1AH50 6GT2 391-1BN25

Technical data

Table 5-18 Technical data of the SLA 71

Inductive interface to MDS	
Read/write distances (SLG - MDS), max.	100 mm (see field data)
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	106 kbaud
Line length to ASM, max.	55 m
Voltage (only via ASM)	12 V DC
Current consumption at room temperature	160 mA (typical)
MTBF (at +40° C)	1 x 10^5 hours

Table 5-18 Technical data of the SLA 71

Housing	
Dimensions without connection cable (L x W x H in mm)	75 x 75 x 20
Color	Anthracite
Material	Polyamide 12
Plug connection	0.5 m cable with 8-pin M12 plug connector (pin on device side)
Protection rating in acc. w. EN 60529	IP 65
Shock in acc. w. EN 60721-3-7/class 7M2 Total shock response spectrum, type II	30 g[1]
Vibration in acc. w. EN 60721-3-7/ class 7M2	5 g (9 to 200 Hz)[1] 10 g (200 to 500 Hz)[1]
Mounting of the SLA 71	2 M5 screws
Tightening moment at 20° C	≤ 2 Nm
Ambient temperature	
Operation	-20° to +70° C
Transportation and storage	-40° to +85° C
Weight without connection cable (approx.)	150 g

1 **Warning:** The values for shock and vibration are maximum values. These values may not occur on a regular basis.

Field data

Table 5-19 Field data of SLA 71

Working distance (Sa)	10 to 70 mm
Limit distance (S_g)	100 mm
Diameter of transmission window (L_d)	Depends on MDS
Minimum distance from SLA to SLA (D)	D_a > 800 mm

Transmission window

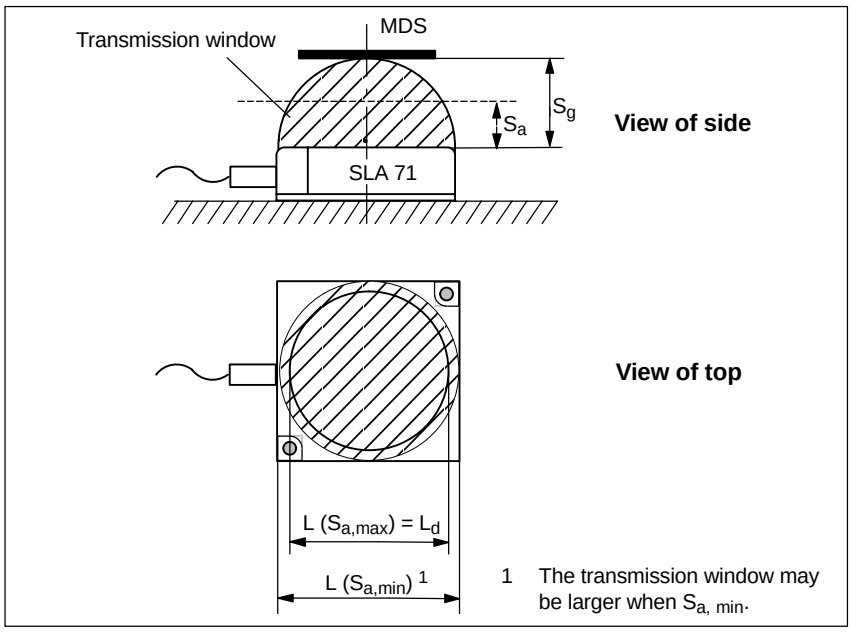


Figure 5-27 Transmission window of SLA 71

Metal-free space

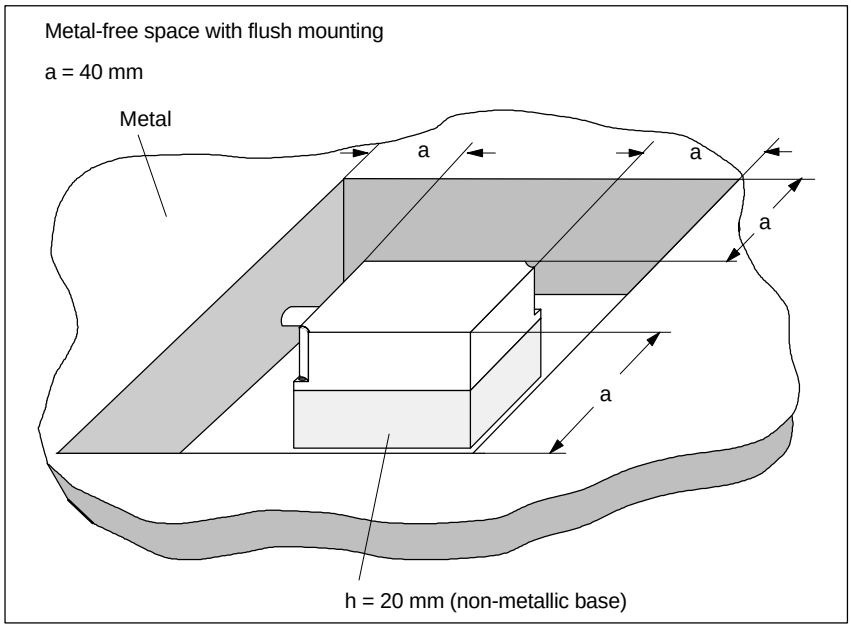


Figure 5-28 Metal-free space for SLA 71

Definition of distance D

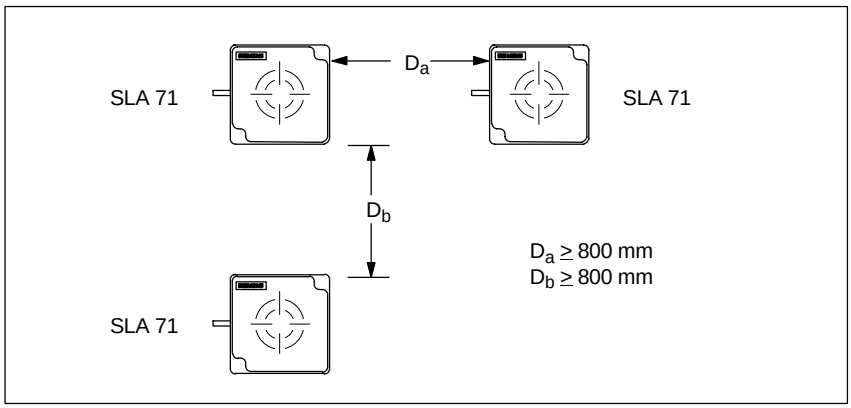


Figure 5-29 Distance D: SLA 71

Dimensions (in mm)

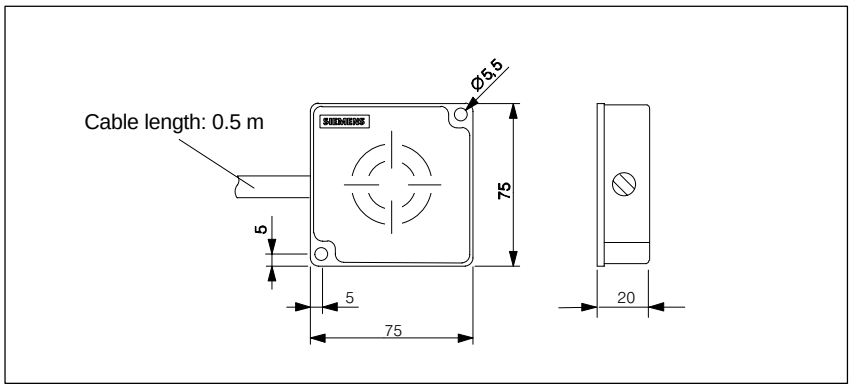


Figure 5-30 Dimensional drawing of SLA 71

6 Interfaces

6.1 Introduction

Application area

ASM interfaces provide the link between MOBY E components (i.e., SLGs/ SLAs and MDSs) and higher level controllers (e.g., SIMATIC S5/S7), PCs or computers. Up to four SLGs/SLAs can be connected depending on the interface used.

Layout and functions

An ASM consists of a microcontroller system with its own program stored on a PROM. The CPU receives commands via the user interface and stores these in the RAM. The user receives an acknowledgment that the command has arrived. When the command is correct, the CPU begins execution.

Overview

Table 6-1 Overview of the interfaces

ASM Type	Interfaces to PC/ Computer	Interfaces to SLG/SLA	Function Blocks	SLG/SLA Connections	Dimensions (WxHxD in mm)	Temperature Range (During Operation)	Protection Rating
ASM 400	Can be installed in S5-115-155U	9-pin sub D socket	FB 250/ 230/252	1 per CM 4 per ASM		0˚ to +55˚ C	IP 00
ASM 410	Can be installed in S5-100U/ ET 200U	Can be connected via bus module		2 (multiplex)	45 x 135 x 100	0˚ to +60˚ C	IP 20
ASM 420	V.24, RS 422, TTY (w. multipoint terminal strip, model F, DIN 41612)	9-pin sub D socket	3964R Driver	1	20 x 100 x 160	0˚ to +55˚ C	IP 00
ASM 450	To PROFIBUS-DP (screw connection)	2 5-pin proximity switch plug connectors	FC 45 FC 46 FB 240	2 (multiplex)	134 x 110 x 55	0˚ to +55˚ C	IP 65
ASM 470	Can be installed in S7-300/ ET 200M	Via screw terminals	FC 47 FB 47	2 (multiplex)	45 x 125 x 120	0˚ to +60˚ C	IP 20
ASM 724	RS 232/RS 422 (9-pin submin D socket)	9-pin submin D socket	MOBY API	4 x SLA (multiplex)	205 x 130 x 60	-25˚ to +55˚ C	IP 40
ASM 754	PROFIBUS-DP/ V1 (9-pin submin D socket)	9-pin submin D socket	FC 45	4 x SLA (multiplex)	205 x 130 x 60	-25˚ to +55˚ C	IP 40
SIM	RS 232/RS 422 (15-pin submin D plug connnector	Integrated	3964R driver MOBY API C-lib	---	160 x 80 x 40 (without ext. ANT)	-25˚ to +75˚ C	IP 67 (with special plug)

6.2 ASM 400

6.2.1 Overview

Application area

ASM 400/401 interfaces can be directly installed and operated in the following SIMATIC S5 programmable controllers.

- S5-155U/F (all CPUs)
- S5-135U (all CPUs)
- S5-155U/H (all CPUs)

Layout and functions

ASM 400 interfaces consist of the basic module in double Europe format and the CM 422 channel submodule. The basic module can be equipped with one to four channel submodules. Mixed configuration is not permitted.

The ASM 400 with the CM 422 operates in the I/O area of the SIMATIC S5. When used with function block FB 250, up to 32 channel submodules (i.e., eight 4-channel interfaces) can be operated in one SIMATIC. When FB 252 is used, the maximum number of channel submodules is increased from 32 to 96 per SIMATIC S5. All MDS models can be processed via the FBs. The user addresses the data on the MDS via a command table in the data block. The user addresses user data via absolute addresses.

Note

To achieve optimal transmission times, the length of the block should not exceed 150 bytes per command.

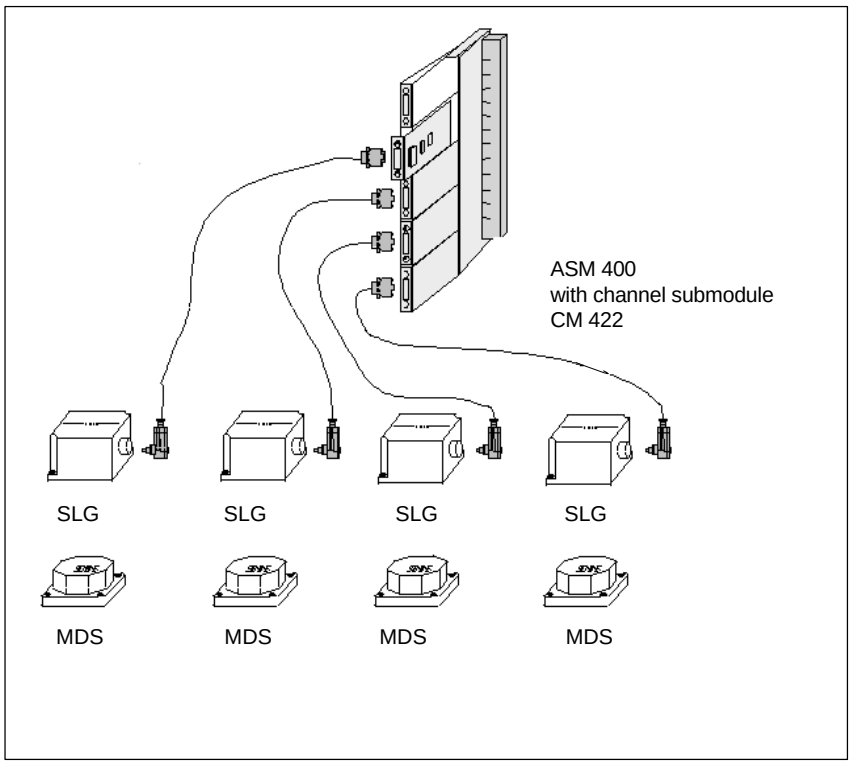


Figure 6-1 Configurator of ASM 400

Communication between ASM 400 and user program

Communication time between ASM 400 and user depends on two factors.

- Cycle time and type of programmable controller
- Software used (i.e., FB 250)

Communication between ASM 400 and user can be divided into three steps.

- The user issues a command and starts it. The next time the FB is called, the command is transferred to the ASM and acknowledged by the ASM.
- The ASM executes the command with the MDS. The user and the FB are in wait status. Data communication with the MDS begins as soon as an MDS enters the transmission window of the SLG. The MDS data are stored intermediately on the ASM and checked for correctness.
- ASM communication with the MDS is concluded. When the FB is called the next time, the data which have been read or written are transferred from the ASM to the user. The user receives a finished message.

Ordering data

Table 6-2 Ordering data of ASM 400

	Order No.
ASM 400 interface consisting of basic module and CM 422 channel module	
Basic module with connection to STG, with 4 slide-in slots for CM 422 channel module, without channel module	6GT2 002-0AA00
CM 422 channel module	6GT2 002-0AB00
MOBY software[1] with FB 230/240/250	6GT2 080-2AA10
Description of ASM 400/401	
German	6GT2 097-3AB00-0DB1
English	6GT2 097-3AB00-0DB2
Description of FB 250 for ASM 400	
German	6GT2 097-3AA00-0DA1
English	6GT2 097-3AA00-0DA2
Plug-in lines and accessories	See chapter 7.8.

1 See chapter 7.1.

Technical data

Table 6-3 Technical data of ASM 400

Channel Submodule	**CM 422**		
Serial interface to SLG	RS 422		
Plug connector	9-pin sub D socket		
Max. interface/line length	RS 422/1000 m, depending on SLG type		
SLG which can be connected	1 SLG per CM		
Software functions			
Programming	With STEP 5 function block FB 250		
Commands	Read data, write data, initialize MD		
	Access directly via addresses		
Supply voltage	DC 5/24 V via internal bus		
Interfaces	**ASM 400**		
Interfaces for CM/SLG			
ASM 400 (max.)	4 CM 422		
Interface to STG 4F	RS 422, 9-pin sub D socket		
Interface for 24 V DC	2-pin plug connector (included)		
Supply voltage			
Nominal value	5/24 V DC		
Permissible range			
Internal (at 5 V)	4.75 to 5.25 V DC		
External (at 24 V)	20 to 30 V DC		
Current consumption (max.)			
Internal (at 5 V)	1 channel	370	mA
	2 channels	490	mA
	3 channels	610	mA
	4 channels	730	mA
External (at 24 V)	1 channel	400	mA
	2 channels	800	mA
	3 channels	1200	mA
	4 channels	1600	mA
Fine-wire fuse	M 1.25 A/250 V		
Ambient temperature			
During operation	0° to +55° C		
During transportation and storage	-20° to +70° C		
Rel. humidity at 25° C	< 95%		
Space requirements	1 SEP (1 SEP = 15.24 mm)		
Weight (approx.)			
ASM 400	0.44 kg		
CM 422	0.1 kg		

Function block FB 250

Function block FB 250 controls data transmission between the STEP5 program and the ASM 400 interface module.

FB 250 can be used on the following “programmable controllers.”

- 115U/F
- 135U-R/S
- 155U/H

FB 250 does not use system commands.
All MDSs can be processed with FB 250.

Primary functions of FB 250

- Convert data from user parameterization structure to structure of an ASM
- All communication with the ASM via command data exchange
- Error handling: Command repetition; Preparation of errors for the user

Chaining of several partial commands into one complete command

- Reading and writing with a user command
- Any address areas of a mobile data memory can be processed with one command.
- Control of PLC cycle load via the user

Data transmission between FB and MDS can be subdivided into three phases.

- Supply interface with the appropriate command and the data or parameter
- Transmit the data between ASM 400 and MDS
- Supply S5 with appropriate parameters or data from the interface

When the P address area is available, FB 252 also supports operation of the ASM 400 in the expanded Q address area.

6.2.2 Hardware Description

Plug connectors and their assignment

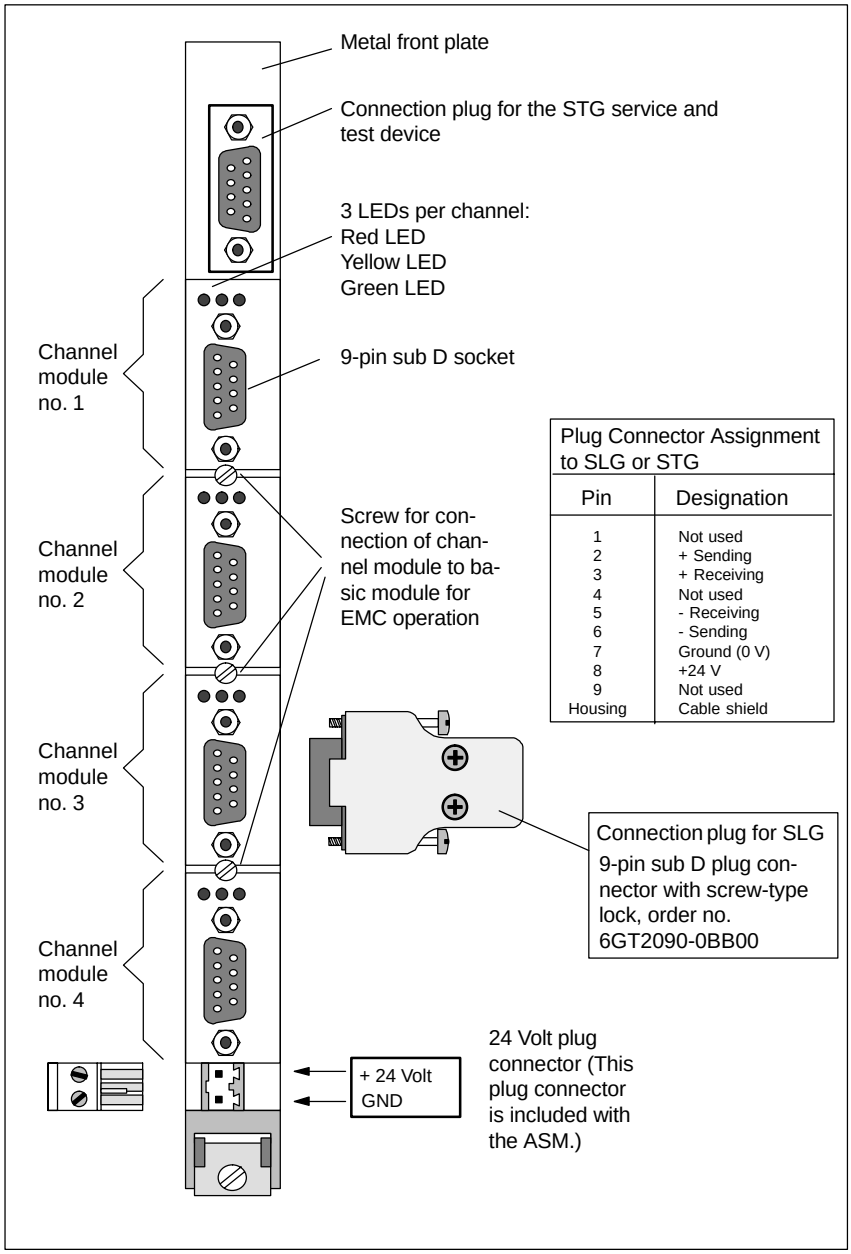

Metal front plate
Connection plug for the STG service and test device
3 LEDs per channel:
Red LED
Yellow LED
Green LED
9-pin sub D socket
Channel module no. 1
Channel module no. 2
Channel module no. 3
Channel module no. 4
Screw for connection of channel module to basic module for EMC operation
Plug Connector Assignment to SLG or STG
Pin | Designation
1 Not used
2 + Sending
3 + Receiving
4 Not used
5 - Receiving
6 - Sending
7 Ground (0 V)
8 +24 V
9 Not used
Housing Cable shield
Connection plug for SLG
9-pin sub D plug connector with screw-type lock, order no. 6GT2090-0BB00
+ 24 Volt
GND
24 Volt plug connector (This plug connector is included with the ASM.)

Figure 6-2 Plug connectors and their assignment for ASM 400

Switches and plug-in jumpers

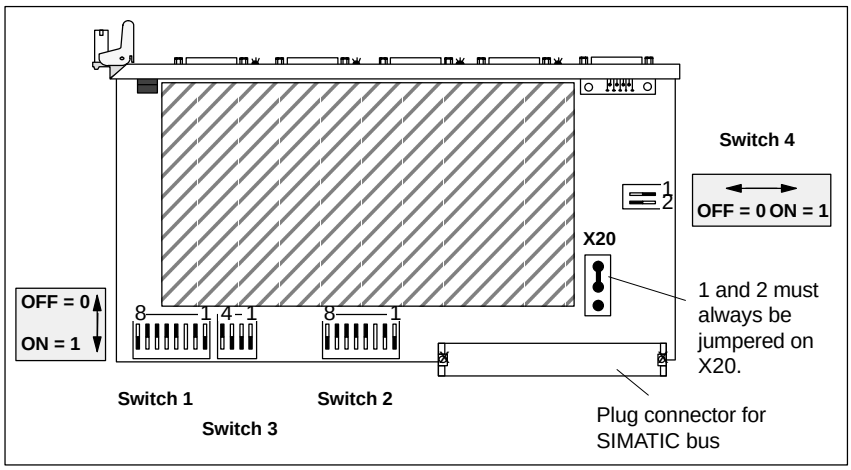


Figure 6-3 Switches and plug-in jumpers for ASM 400

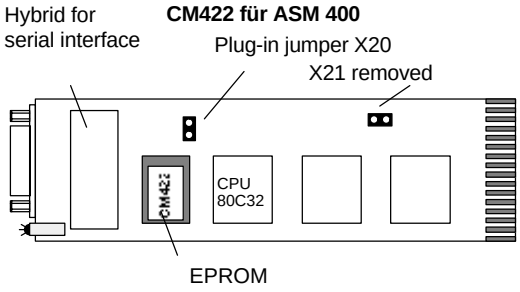
Address settings

S4 = Setting of the type of addressing
S2 = Setting of the page frame number
S3 = Setting of the module address (linear addressing with PESP)
S1 = Address setting when PESP is not used

Table 6-4 Address settings for ASM 400 with FB 250/252

ASM 400 Switch Setting			FB 250 Parameterization		FB 252 Parameterization	
Start Adress of ASM	**Switch S3 4 3 2 1**	**Switch S4 2 1**	**ADR**	**KAN***	**QADR**	**KAN**
0	0 0 0 0	0 1 (This setting of switch 4 must always be used when the module is operated in standard mode.)	Not available		0	1 - 4 (Corresponds to channel module 1 to 4)
16	0 0 0 1				16	
32	0 0 1 0				32	
48	0 0 1 1				48	
64	0 1 0 0				64	
80	0 1 0 1				80	
96	0 1 1 0				96	
112	0 1 1 1				112	
128	1 0 0 0		128	1 - 4 (Corresponds to channel module 1 to 4)	128	
144	1 0 0 1		144		144	
160	1 0 1 0		160		160	
176	1 0 1 1		176		176	
192	1 1 0 0		192		192	
208	1 1 0 1		208		208	
224	1 1 1 0		224		224	
240	1 1 1 1		240		240	

Settings on the channel module



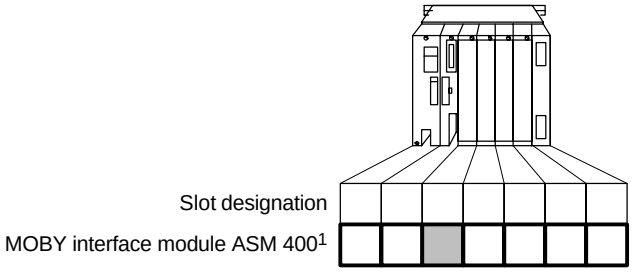
Plug-in jumper X20:

- Removed:
  Normal operation
- Inserted:
  Test operation; dialog to the mobile data memory is aborted earlier when malfunctions occur. This helps to pinpoint weak spots and malfunctions during commissioning.

Figure 6-4 Settings on the channel module

6.2.3 SIMATIC S5 Configuration

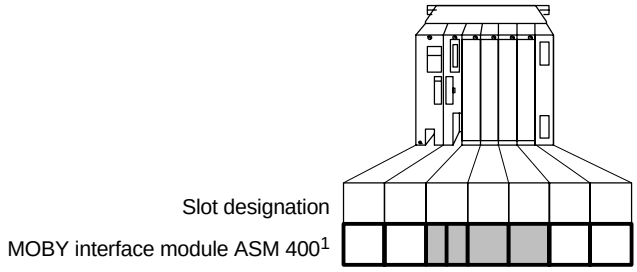
Module rack CR 700-0LA (S5-115U)



1 One SIMATIC adapter capsule required for each ASM 400 (order no. 6ES5 491-0LB11)

Figure 6-5 CR 700-0LA module rack (S5-115U)

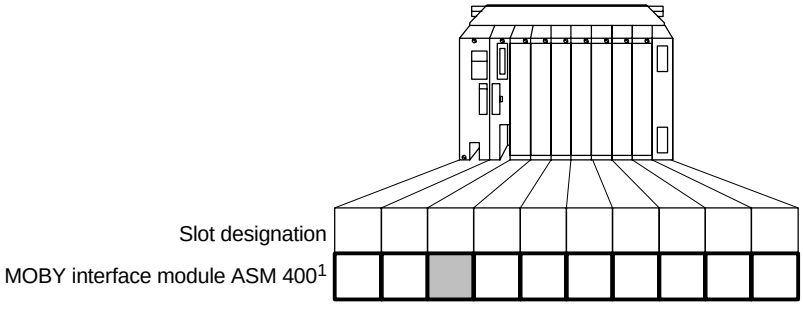
Module rack CR 700-0LB (S5-115U)



1 One SIMATIC adapter capsule required for each ASM 400 (order no. 6ES5491-0LB11)

Figure 6-6 CR 700-0LB module rack (S5-115U)

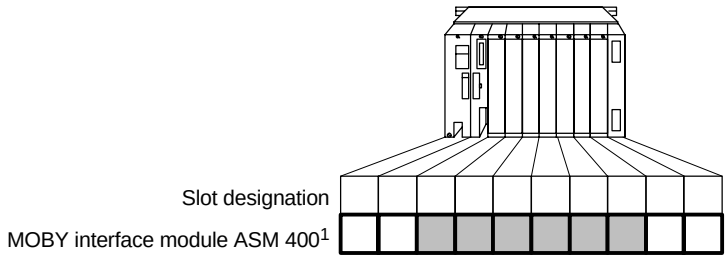
Module rack CR 700-1 (S5-115U)



1 One SIMATIC adapter capsule required for each ASM 400 (order no. 6ES5491-0LB11)

Figure 6-7 CR 700-1 module rack (S5-115U)

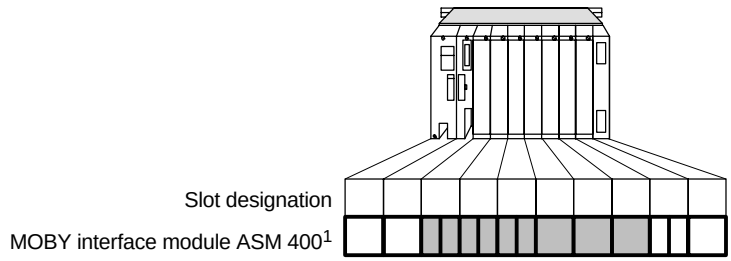
Module rack CR 700-2 (S5-115U)



1 One SIMATIC adapter capsule required for each ASM 400 (order no. 6ES5491-0LB11)

Figure 6-8 CR 700-2 module rack (S5-115U)

Module rack CR 700-3 (S5-115U)



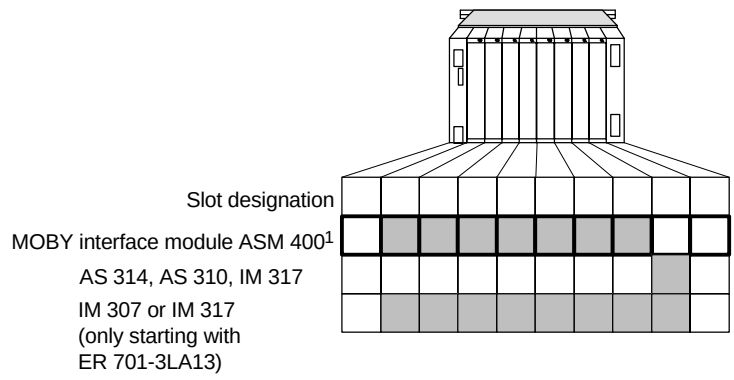
1 One SIMATIC adapter capsule required for each ASM 400 (order no. 6ES5491-0LB11)

Figure 6-9 CR 700-3 module rack (S5-115U)

Module rack ER 700-0, ER 701-1 and ER 701-2

ASM 400 MOBY interface modules cannot be used.

Module rack ER 701-3



1 One SIMATIC adapter capsule required for each ASM 400 (order no. 6ES5491-0LB11)

Figure 6-10 ER 701-3 module rack (S5-115U)

Central controller S5-135U/ -155U

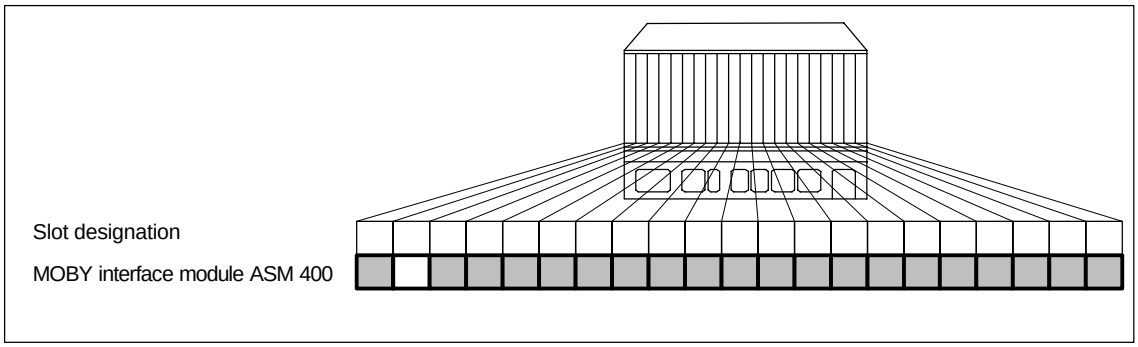


Figure 6-11 S5-135U/-155U central controller

Central controller S5-155U/155H

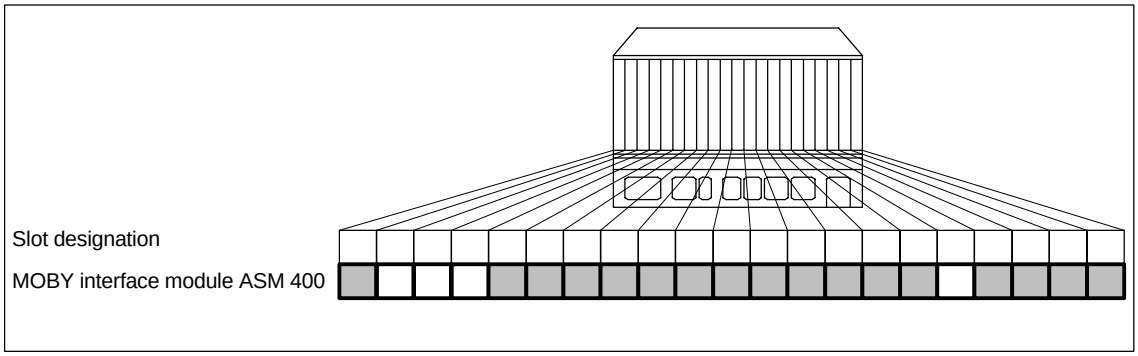


Figure 6-12 S5-155U/-155H central controller

Expansion device EG S5-183U

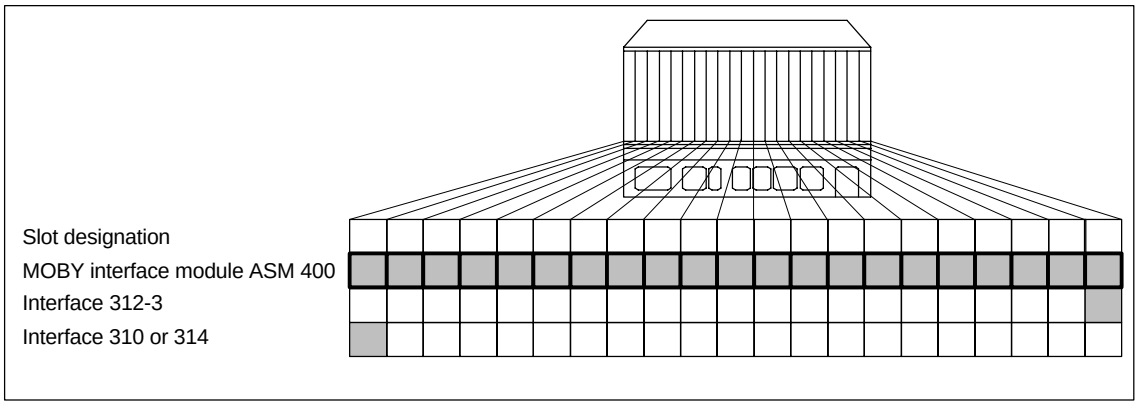


Figure 6-13 EG S5-183U expansion device for S5-135U/-155U

Expansion device EG S5-184U

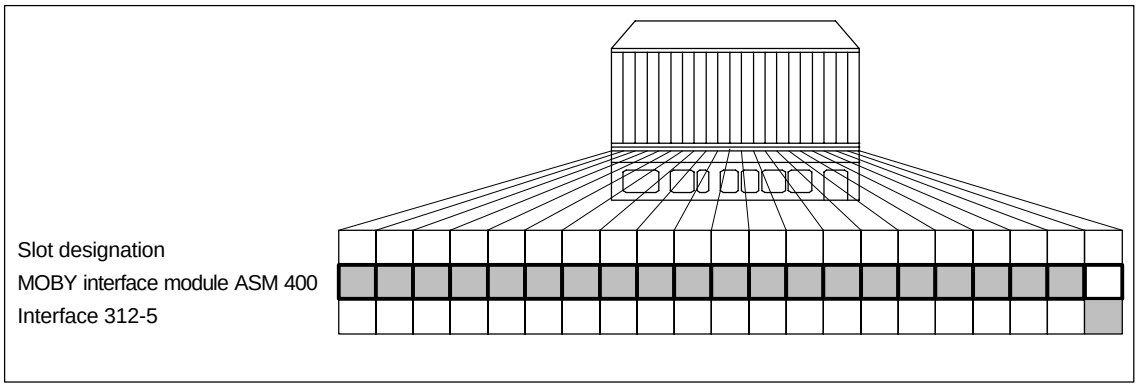


Figure 6-14 EG S5-184U expansion device for S5-135U/155U

Expansion device EG S5-185U

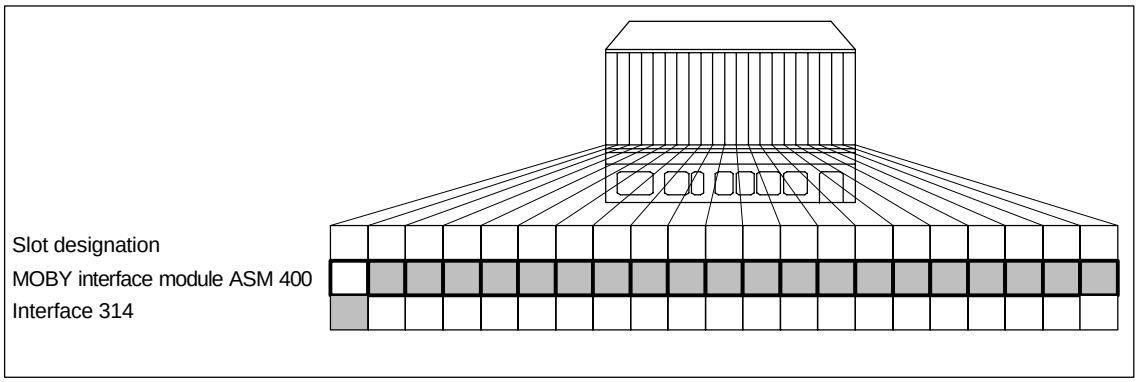


Figure 6-15 EG S5-185U expansion device for S5-135U/155U/155H

Expansion device EG S5-187U

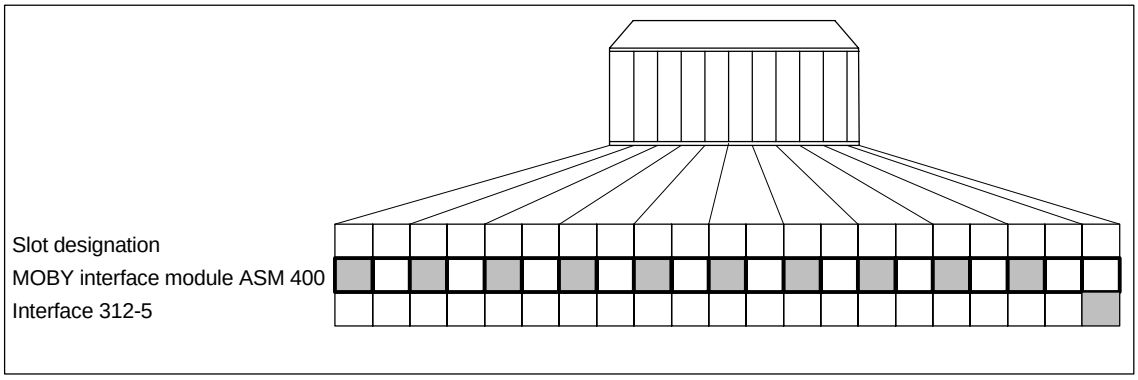


Figure 6-16 EG S5-187U expansion device for S5-135U/155U

6.3 ASM 410

Application area

Interface ASM 410 can be used in the SIMATICs listed below.

- S5-90U (max. of 2)
- S5-95U (max. of 4)
- S5-100U (max. of 8)
- ET 100U (max. of 2)
- ET 200U (max. of 4)

Since this ASM can be used with all mobile data memories, read/write devices and the STG service test device, compatibility with all MOBY components is ensured.

Layout and function

LEDs for status and error indications are located on the front. Interference-immune design is provided by the galvanic isolation of the MOBY interface to the SIMATIC S5 bus. The MOBY commands are started and data are fetched by setting and scanning a few control bits in the process image (PIO/PII), and eight input/output bytes are assigned. In time-multiplex operation, one or two SLGs can be used. The MDS data are accessed via their absolute addresses.

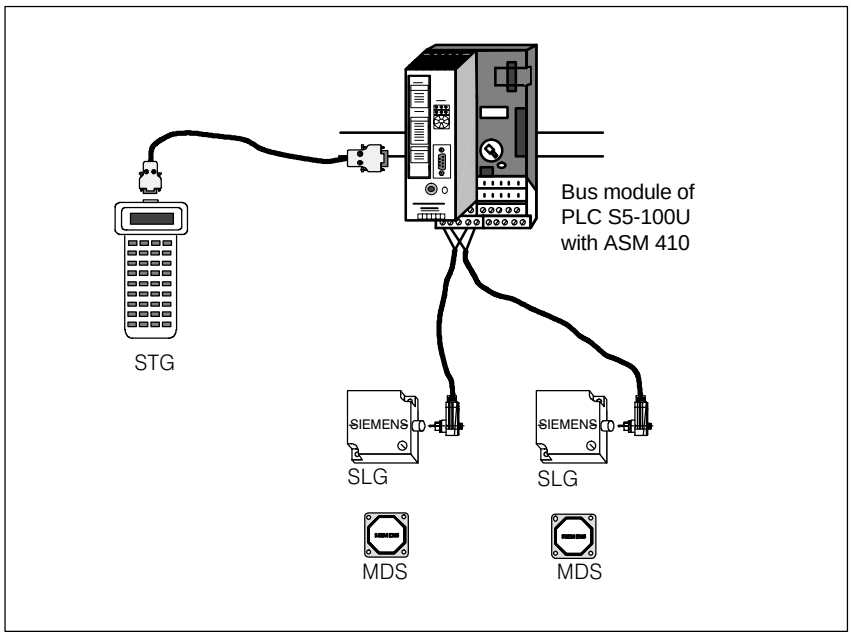


Figure 6-17 Configurator for ASM 410 in SIMATIC S5

Ordering data

Table 6-5 Ordering data of ASM 410

	Order No.
ASM 410 interface	6GT2 002-0BA00
SIMATIC S5, bus module	
Screw-type connection	6ES5 700-8MA11
Crimp connection, with crimp contacts, increased EMC resistance	6ES5 700-8MA22
Description of ASM 410	
German	6GT2 097-3AC00-0DA1
English	6GT2 097-3AC00-0DA2
Plug-in lines and accessories	See chapter 7.8.

Technical data

Table 6-6 Technical data of ASM 410

Serial interface to SLG	RS 422
Connection (max.)	2 SLGs can be connected via a separate bus module
Line length (typ. max.)	1000 m/RS 422, depending on SLG and type of cable
Number of SLGs	
• Static operation	2 SLGs (7x)
• Dynamic operation	1 SLG (7x)
Interface to STG	RS 422, 9-pin sub D plug connection
Interface for 24 V DC	Via a separate bus module
Software functions	
Programming	With STEP5 directly via process image (PIO/PII); no function block required; 5 bytes processed per command
Commands	Select channel 1 or 2, read MDS, write MDS, initialize MDS, etc.
Supply voltage	
Nominal value Permissible range	24 V DC (residual ripple, max. of 10%) 20 to 30 V DC
Current consumption	
Internal (at 5 V) Typical	20 to 60 mA (20 mA = long cycle time) (60 mA = short cycle time)
Max.	110 mA (PLC in STOP status)
External (at 24 V DC)	
All SLGs, SLG switched off	90 mA (see SLG description)
Power consumption, typ. (without SLG)	2.5 W
Cooling	Convection cooling
Isolation group	C in acc. w. VDE 0110
Protection rating	IP20 in acc. w. IEC 529
Physical stress	IEC 68-2-27
Ambient temperature	
During operation	
• Horizontal SIMATIC layout	0° to +60° C
• Vertical SIMATIC layout	0° to +40° C
During transportation and storage	-25° to +70° C
Weight (approx.)	0.25 kg

Slots in PLC S5-90U

PLC S5-90U provides a maximum of four slots for additional modules. Up to two of these can be used by the ASM 410 module.

Slots in PLC S5-95U

ASM 410 can only be operated with PLC S5-95U in slots 0 to 7. Up to four modules can be used on one PLC.

Starting with CPU release status -8MA-3, 8 modules can be used.

Slots in PLC S5-100U

ASM 410 can only be operated with PLC S5-100U in slots 0 to 7. Up to eight modules can be used on one PLC. See the following table for slot-oriented addressing.

	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
S5-100U	64 to 71	72 to 79	80 to 87	88 to 95	96 to 103	104 to 111	112 to 119	120 to 127	

Slot number

Address assignment

Free slots for additional digital modules

Configuration of ASM 410 in ET 100U

The ASM 410 must be operated as an analog module in the ET 100U. When parameterizing the module with the "COM ET 100U" software, the module must be specified with "4AX" in the appropriate slot. The ASM 410 occupies eight input bytes and eight output bytes (i.e., 16 bytes). Since a maximum of 32 bytes can be assigned per ET 100U in the address image of the main controller, a maximum of two modules per ET 100U are permitted. When other modules are used with an ET 100U in addition to the ASM 410, only one module can be connected.

On the ET 100U, the ASM 410 can be addressed via all address areas of the PLC (i.e., P, Q, IM3 and IM4).

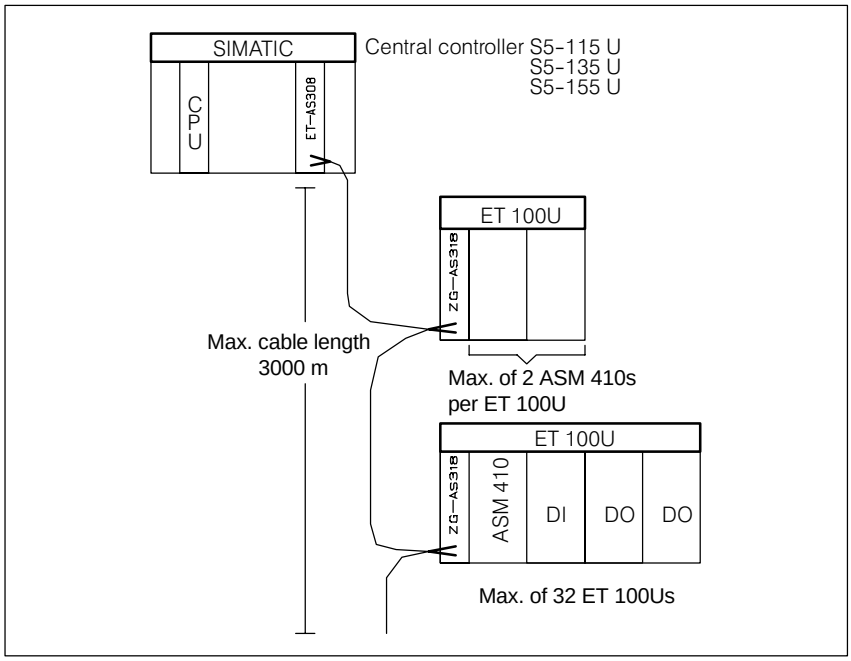


Figure 6-18 Configurator for ASM 410 in ET 100U

Configuration of ASM 410 in ET 200U

The ASM 410 can be used with the ET 200U under the following conditions.

- The ET 200U with an ASM 410 installed must be operated in slow mode. See ET 200U manual for how to set slow mode.
- The "COM ET 200U" software is used to parameterize the ASM 410. The ASM 410 module must be parameterized there with "095".
- Up to four ASM 410s can be used with one ET 200U. When DI/DO or other periphery is used with the ET 200U, fewer ASM 410s can be used.

Otherwise the same conditions as for the ET 100U apply.

Physical layout

The ASM 410 interface has the same dimensions as any standard module for the SIMATIC S5-100U. The interface can be installed directly on the bus module (6ES5 700-8MA11 or 6ES5 700-8MA22).

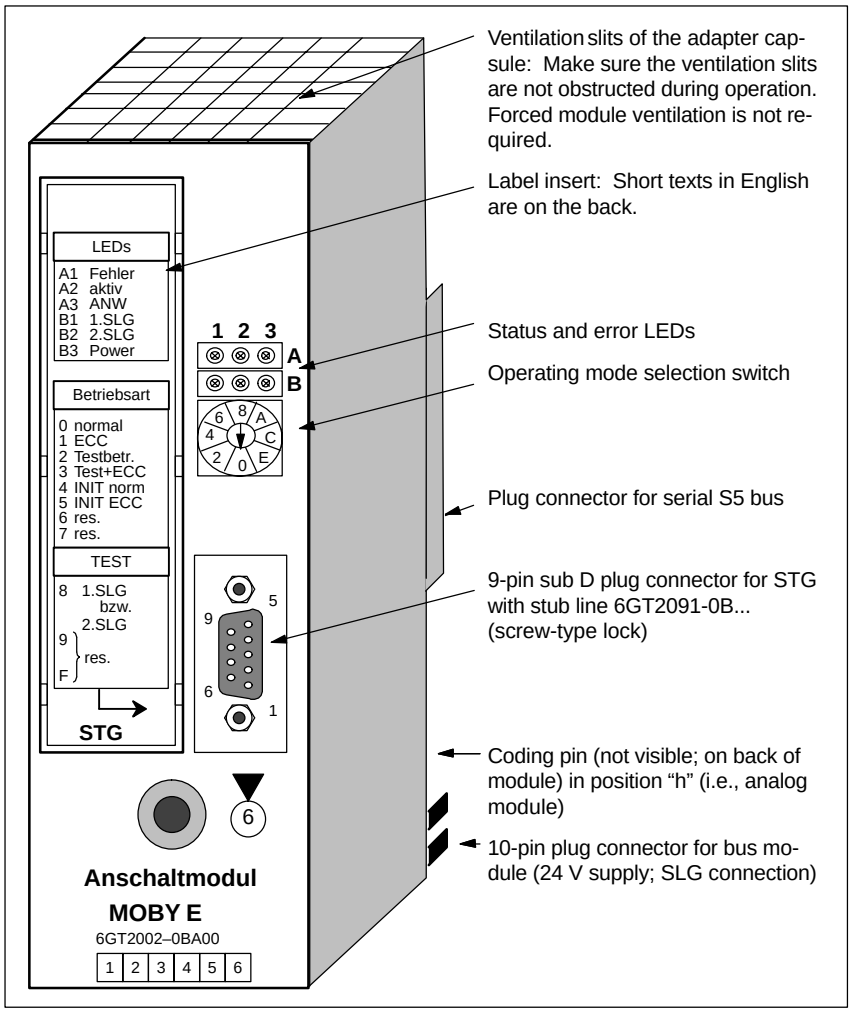


Figure 6-19 ASM 410 interface with operational and indicator elements

Table 6-7 Status and error LEDs of ASM 410

No.	Color	Meaning
A1	Red	Error: The last command was concluded with an error, or the hardware of the module is defective.
A2	Yellow	Rapid irregular flashing indicates running dialog with the SLG or mobile data memory (MDS). This LED is always on when the presence check is enabled.
A3	Green	Data memory is in the field of the SLG. The SLG which detected the MDS is indicated via LEDs B1-B2. LED is only active when presence check is being used.
B1	Green	B1 = 1st SLG is in operation. Remember: Only one of the LEDs (i.e., B1 and B2) may be on at a time. If both LEDs are on, check the wiring to the SLG.
B2	Green	B2 = 2nd SLG is in operation. Remember: Only one of the LEDs (i.e., B1 and B2) may be on at a time. If both LEDs are on, check the wiring to the SLG.
B3	Green	B3 = power on This LED is always on when 24 V is applied to the module. The interface module can be tested with the STG.

Setting the operating mode

The operating mode is set with the operating mode selection switch on the front of the ASM.

Positions 0 to 7

Setting of the operating mode:
ASM 410 uses the serial S5 bus. The STG interface is switched off.

Positions 8 to F

Test operation with the STG:
Telegrams from the S5 are no longer processed (does not apply to MOBY E).

Note

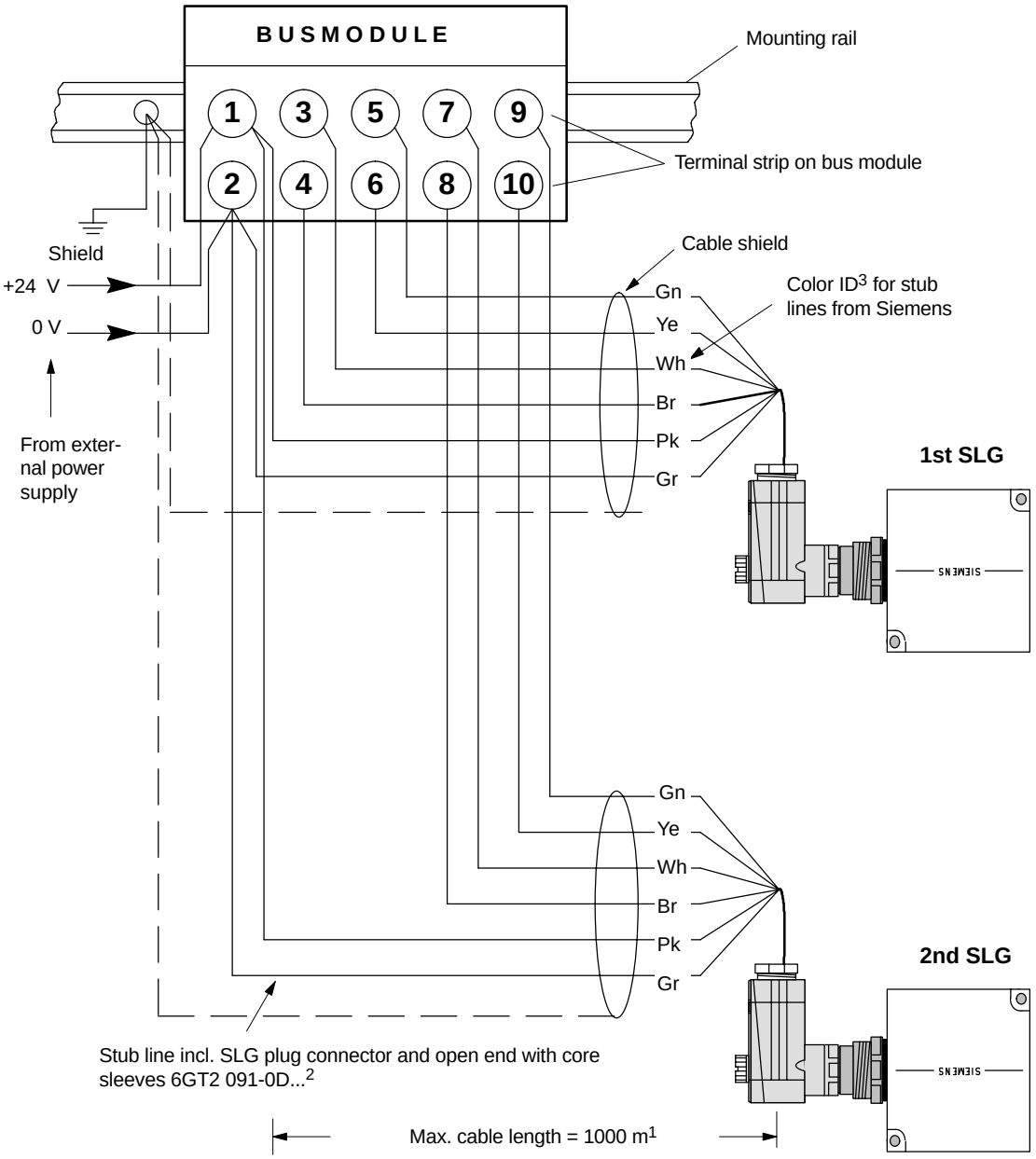
The serial S5 bus functions are not affected by switching to test operation since this interface has its own microprocessor and is not dependent on MOBY activities.

Table 6-8 Operating modes for ASM 410

Switch Setting	Short Description on Label Insert	Meaning
0	Normal	Normal operating mode; read and write all MDS types; ECC driver is disabled.
1[1]	ECC driver	Read and write all MDS types; EEC driver is enabled.
2	Test operation	All MDS types can be processed during test operation. The ASM 410 performs stricter error checks for communication with the MDS so that weak points and malfunctions can be detected during commissioning.
3[1]	Test + ECC	The ECC driver is enabled. Otherwise same as switch setting 2.
4	INIT normal	Initializes the MDS. When a write command is started via the process image, an INIT command to the MDS is started. The contents of the MDS are deleted.
5[1]	INIT ECC	Initializes the MDS with ECC driver. Otherwise same as switch setting 4.
6	Reserved	
7	Reserved	
8[1]	Test 1st or 2nd SLG	An STG can be connected via the 9-pin sub D plug connector so that all MOBY E hardware can be tested.
9 to F	Reserved	

1 Do not use switch positions 1, 3, 5 and 8 with MOBY E.

Wiring of one or two SLGs



1 Maximum cable length depends on the SLG and the tolerance of the external 24 V supply.
2 In acc. with MOBY length key
3 Color ID
Gn = green = pin 4 in SLG plug connector; Ye = yellow = pin 5 in SLG plug connector;
Wh = white = pin 6 in SLG plug connector; Br = brown = pin 1 in SLG plug connector;
Pk = pink = pin 2 in SLG plug connector; Gr = gray = pin 3 in SLG plug connector.

Figure 6-20 Wiring of one or two SLGs for ASM 410

6.4 ASM 420

Application area

ASM 420 interfaces all general-purpose modules for the operation of MOBY E devices with a serial interface to the following components.

- All computers
- PCs
- Controllers of other manufacturers

Layout and functions

ASM 420 interfaces are available with one of three physical interfaces (i.e., RS 422, V.24 and TTY). They are available in single Europe format and can be installed in all standard module racks.

The ASM 420 accesses data on the MDS directly with physical addresses.

Note

To achieve optimal transmission times, the length of the block should not exceed 150 bytes per command.

Possible installation of ASM 420

The ASM 420 is a plug-in card without a special protection rating. Several possible methods of card installation are available to the user.

- The user's own plug-in card holder which is mounted in a switching cabinet. The user provides the 24 V voltage supply.
- Four or 8 ASM 420 can be installed in module rack BGT 4/BGT 8. The module rack includes a power pack. Cf. chapter 7.2.
- An ASM 420 can be installed in the "plastic housing." The housing is small and is equipped with a plug connector power pack. Cf. chapter 7.3.

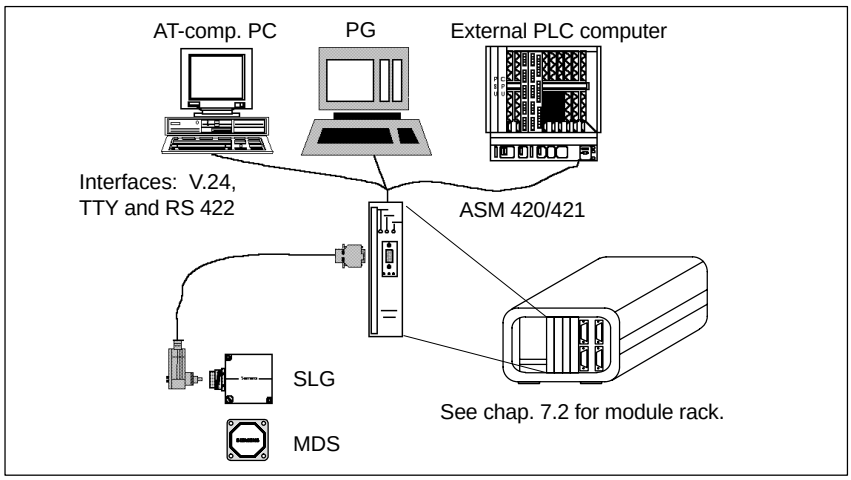
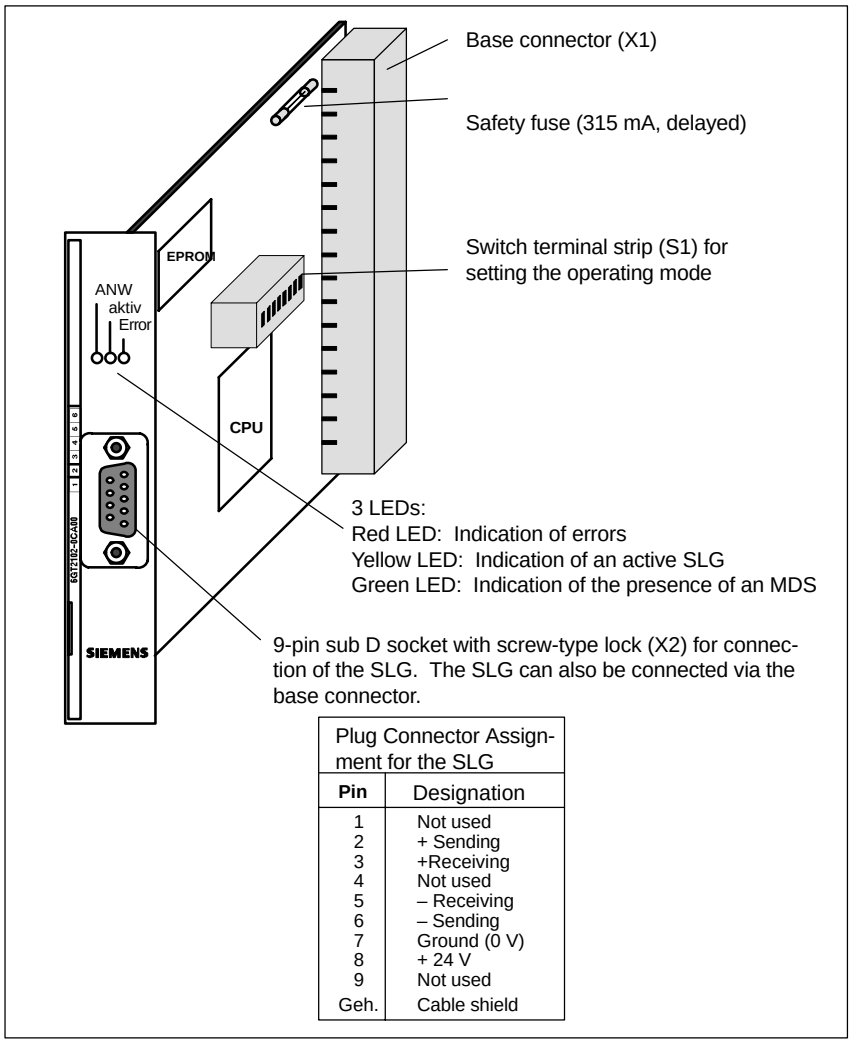


Figure 6-21 Configurator for ASM 420

Hardware ASM 420


Base connector (X1)
Safety fuse (315 mA, delayed)
Switch terminal strip (S1) for
setting the operating mode
EPROM
ANW
aktiv
Error
CPU
3 LEDs:
Red LED: Indication of errors
Yellow LED: Indication of an active SLG
Green LED: Indication of the presence of an MDS
9-pin sub D socket with screw-type lock (X2) for connection of the SLG. The SLG can also be connected via the base connector.
SIEMENS

Plug Connector Assignment for the SLG

Pin	Designation
1	Not used
2	+ Sending
3	+Receiving
4	Not used
5	– Receiving
6	– Sending
7	Ground (0 V)
8	+ 24 V
9	Not used
Geh.	Cable shield

Figure 6-22 ASM 420 interface with operational and indicator elements

Ordering data

Table 6-9 Ordering data of ASM 420

	Order No.
ASM 420 interface	
With V.24 (RS 232) interface	6GT2 002-0CA00
With RS 422 (RS 485, V.11) interface	6GT2 002-0CB00
With TTY (linear current) interface	6GT2 002-0CC00
MOBY software[1] with FB 230/240/250, FC 47, 3964R drivers and tools for DOS	6GT2 080-2AA10
Module rack with power pack	
For 4 ASM 420s	6GT2 090-0KA00
For 8 ASM 420s	6GT2 090-0LA00
Description of ASM 420	
German	6GT2 097-3AF00-0DA1
English	6GT2 097-3AF00-0DA2
Description of T3964R, stapled	
German	6AW5 450-4BX00-0K
English	6AW5 450-4BX00-1K
Plug-in lines and accessories	See chapter 7.8.

1 See chapter 7.1.

Technical data

Table 6-10 Technical data of ASM 420

Interface to PC/computer	
Connection	Via multi-point terminal strip (model F, DIN 41612)
Procedure	3964R SINEC L1 LAUF SINUMERIK protocol
Transmission rate	2400 to 9600 baud and 38400 baud[1]
Line length (typ. max.)	1000 m (shielded)/TTY 1000 m (shielded)/RS 422 30 m (shielded)/V.24
Serial interface to SLG	RS 422
Connection	9-pin sub D socket
Line length	Depends on SLG; max. of 1000 m (shielded)
Number of SLGs connectable	1
Software functions	
Programming	Depends on PC, computer, external PLC
Driver for MS-DOS	3964R driver with MS-C interface
Driver for Windows 95	3964R driver on request
MDS addressing	Direct access via addresses
Commands	Initialize MDS, read data, write data, and so on
Supply voltage	
Nominal value	24 V DC
Permissible range	20 to 30 V DC
Current consumption	
No-load current (max.) (without SLG, DO not loaded)	200 mA
Ambient temperature	
During operation	0° to +55° C
During transportation and storage	-40° to +70° C
Protection rating in acc. w. IEC 529	IP00
Dimensions (WxHxD) in mm	20 x 100 x 160 (single Europe format)
Weight (approx.)	0.2 kg

1 A baud rate > 9600 cannot be used for TTY.

Assignment of base connector X1

The following components are connected to base connector X1.

- Voltage supply of ASM and SLG
- Serial interface to user
- Protective ground (shield)
- Control and signal lines (optional)
- SLG (optional)

Table 6-11 Assignment of base connector X1 for ASM 420

Pin	Assigment			Pin	Assigment		
b2	0 V			z2	24 V		
	Depends on type of interface				Depends on type of interface		
	V.24	RS422	TTY		V.24	RS422	TTY
b4	-	R+	+EM	z4	TxD	E+	-EM
b6	RxD	D+	+SE	z6	-	R-	-SE
b8	-	D-	-[1]	z8	GND	E-	-
b10				z10			
b12	DI0	2 digital inputs and outputs each for data carrier controller		z12	DI1	2 digital inputs and outputs each for data carrier controller	
b14	DO0			z14	DO1		
b16	ASM has user data or (Request) acknowledgment			z16	Select module (Select)		
b18	Error code (same as red LED)			z18	Presence (ANW) (same as green LED)		
b20	SLG receiving +			z20	SLG receiving -		
b22	SLG sending +			z22	SLG sending -		
b24				z24			
b26				z26			
b28				z28			
b30	Protective ground ⏚			z30	Protective ground ⏚		
b32	0 V			z32			

1 Do not wire pin b8 for TTY mode.

R+	(Terminal resistance)	TxD	(Transmit data)
E+	(Receiving)	RxD	(Receive data)
D+	(Sending)	+EM	(Receiving)
R-	(Terminal resistance)	-EM	(Receiving)
D-	(Sending)	+SE	(Sending)
E-	(Receiving)	-SE	(Sending)

Setting operating mode for ASM 420

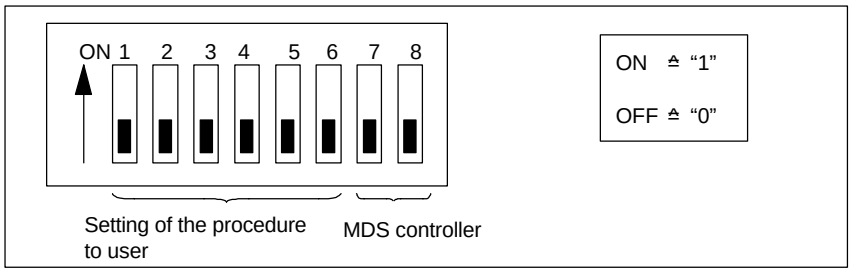


Figure 6-23 Switch strip S1 of ASM 420

The operating modes which can be set here simplify controlling and monitoring the data memory by the user.

Table 6-12 MDS controller and presence check

Switch		Meaning
7	**8**	
0	0	No data memory controller; presence check is disabled; DI/DO can be programmed as desired with the status command.
0	1	Presence check via ASM firmware DI can be used as desired; can be scanned with the DI/DO command.
1	0	Presence check via DI0 and DI1 DI0 = 1 → MDS entering DI1 = 1 → MDS leaving
1	1	Presence check via DI1 DI1 = 1 → MDS leaving DI0 is free and can be scanned with the status command.

Table 6-13 Setting the procedure

Switch						Meaning
1	**2**	**3**	**4**	**5**	**6**	
b	b	1	0	0	0	**39964R: ASM = slave**
b	b	1	1	0	0	**3964R: ASM = master** Standard 3964R procedure for all interfaces: Standard telegrams are processed by the ASM. b b = baud rate (see below)
b	b	a	a	1	0	SINUMERIK 850/880 protocol (without response telegram) Switch: 3 4 — ASM-Addess (= a a) 0 0 — 0 (always present) 0 1 — 1 1 0 — 2 1 1 — 3 b b = baud rate **Caution:** When SINUMERIK is used, switches 7 and 8 must be used to switch on a type of presence check.
b	b	0	1	0	0	**Switch settings not used at this time**
b	b	0	0	0	0	(ASM will not operate with these switch settings.)
b	b	0	1	0	1	
b	b	0	0	0	1	
						Baud rate: (= b b) (Applies to Lauf, 3964R and SINUMERIK procedures)
1	1	x	x	x	x	38400 baud (not permitted for TTY interface)
0	0	x	x	x	x	9600 baud
0	1	x	x	x	x	4800 baud
1	0	x	x	x	x	2400 baud

Table 6-13 Setting the procedure

<table>
<tr><th colspan="6">Switch</th><th>Meaning</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th></th></tr>
<tr><td>a</td><td>a</td><td>a</td><td>a</td><td>1</td><td>1</td><td>SINEC L1 (only RS 422 and TTY)
aaaa = Address of ASM on SINEC L1 bus
(ASM is always the slave.)
The following address assignment applies-
Switch:
<table>
<tr><th>4</th><th>3</th><th>2</th><th>1</th><th>SINEC Address</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>3</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>4</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>5</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>6</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>7</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>8</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>9</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>10</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td><td>11</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>12</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>13</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>14</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>15</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>16</td></tr>
</table>
SINEC addresses 17 to 31 are not available since they cannot be set on the ASM.</td></tr>
<tr><td>b</td><td>b</td><td>1</td><td>1</td><td>0</td><td>1</td><td>Lauf procedure
The standard telegrams are processed by the ASM. All interfaces are available.
b b = baud rate</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>STG connection
3964R procedure; ASM = slave
Baud rate = 4800 baud
Telegram layout is handled internally by MOBY E and can be disregarded by the user. User interface of ASM = RS 422</td></tr>
</table>

6.5 ASM 450

Application area

The ASM 450 interfaces are modules for operation of MOBY devices via PROFIBUS-DP on the following components.

- All computers and PCs
- All controllers

When the interfaces are used on a SIMATIC S7, function blocks are available to the user.

Figure 6-24 ASM 450 interface

ASM 450

The ASM 450 accesses data on the MDS directly with physical addresses. Two interfaces are available to the user.

- The ASM 450 uses cyclic operation with function block FB 240 or FC 44. The description of FC 44 (appendix B) must be adhered to by the SIMATIC S5 user. All other users must use the description of the FC 44 function for the ASM 450.
- The ASM 450 uses acyclic operation with PROFIBUS-DP/V1 (available by mid 2001). The FC 45 function block is available for the SIMATIC S7. In this mode, very large quantities of data can be transferred to and from the ASM without overloading the PROFIBUS cycle. In addition, the ASM can execute chained MDS commands very quickly in this mode.

Up to 2 SLGs can be connected to one ASM 450. Connection of two SLGs is only recommended when static operation is used. When MDSs are processed while passing by (i.e., dynamic operation), there is usually not enough time to switch over the second SLG.

Ordering data

Table 6-14 Ordering data for ASM 450

ASM 450 for PROFIBUS-DP, max. of 2 SLGs connectable	6GT2 002-0EB00
Accessories Plug connector for PROFIBUS-DP connection and 24 V power supply	6ES7 194-1AA00-0XA0
Connection cable, ASM 450 ↔ SLG	6GT2 091-1CH20
Opt. connection plug, ASM 450 ↔ SLG	6GT2 090-0BC00
MOBY software	6GT2 080-2AA10
Other accessories for ASM 450 (network components)	See SIMATIC catalog ST 70 and SIMATIC ET 200X manual.
Replacement part: Plug plate, T functionality for PROFIBUS	6ES7 194-1FC00-0XA0
Description-ASM 450/FC 44 German English	 6GT2 097-3AC30-0DA1 6GT2 097-3AC30-0DA2

Technical data

Table 6-15 Technical data of ASM 450

Serial interface to the user	PROFIBUS-DP (DP/V1 starting mid 2001)
Procedure in acc. w.	EN 50170, vol. 2, PROFIBUS
Connection	PG 11 screw connection PROFIBUS and supply voltage plug connectors are not included. Cf. catalog ST 70: 6ES7 194-1AA00-0XA0)
Transmission speed	9600 baud to 12 Mbaud (automatic recognition)
Max. block length	208 bytes
Serial interface to the SLG	
Plug connector	2 coupling plug connectors (M12)
Line length (max.)	1000 m, depends on SLG (2 m = standard length Other fabricated cables 2.5 m to 20 m))
SLGs which can be connected	2 SLG 7x (multiplex operation)

Table 6-15 Technical data of ASM 450

Software functions	
Programming	Depends on PROFIBUS-DP master
Function blocks	
SIMATIC S5	FB 240
SIMATIC S7	FC 45 or FC 44
MDS addressing	Direct access via addresses
Commands	Initialize MDS, read data from MDS, write data to MDS, and so on
Supply voltage	
Nominal value	24 V DC
Permissible range	20 to 30 V DC
Current consumption	Max. of 180 mA; typical 130 mA (without SLG, DO not loaded)
Digital inputs	
Number	2
Galvanic isolation	Yes
Input voltage	
For logical “0”	0 to 5 V DC
For logical “1”	13 to 30 V DC
Input current for signal “1”	7 mA (typ.)
Delay time	< 10 msec
Digital outputs	
Number	2
Galvanic isolation	Yes
Max. permissible current	0.5 A
Short-circuit protection	Yes (electronic)
Line length (max.)	30 m
Ambient temperature	
During operation	0° to +55° C
During transportation and storage	–40° to +70° C
Dimensions (WxHxD) in mm	134 x 110 x 55
Mounting	4 M5 screws, mounting on any plate or wall
Weight (approx.)	0.5 kg
Protection rating	IP 67
MTBF (at 40˚ C)	30 x 10^4 hours = 34 years

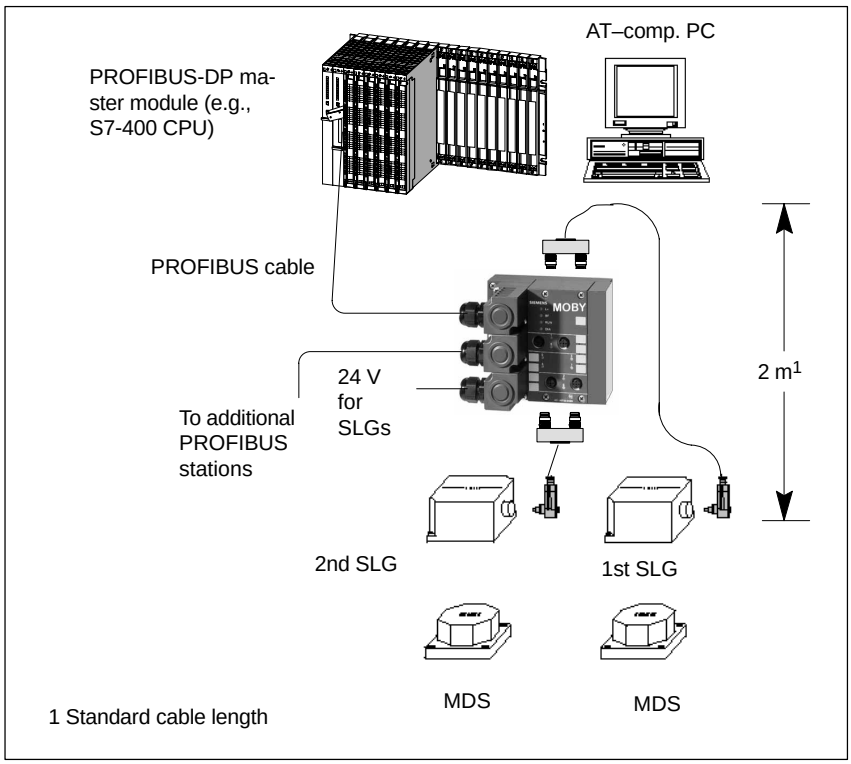


Figure 6-25 Configurator of ASM 450

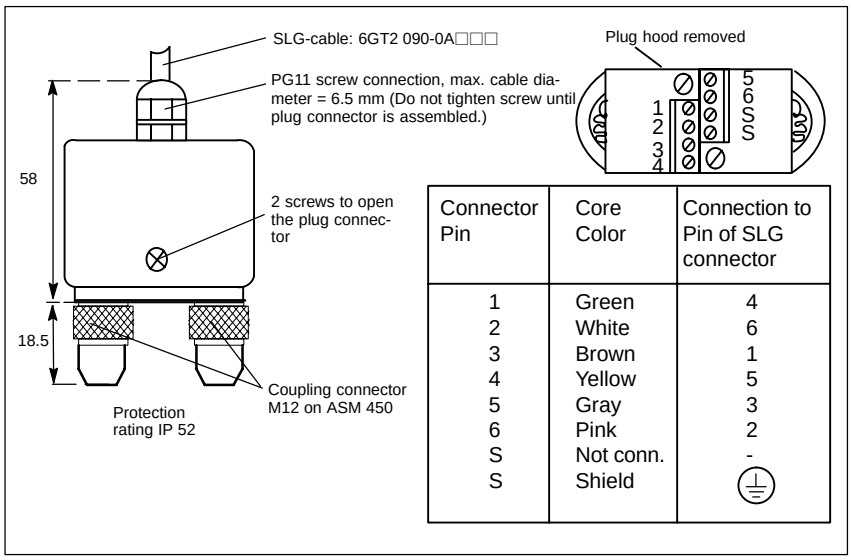
Hardware description

The ASM 450 is equipped with the same housing as the ET 200X decentral I/O device. See ET 200X manual (order no. 6ES7 198-8FA00-8AA0) for general technical information (e.g., mounting, operation and wiring, and general technical specifications). Accessories and power supply components are also described in this manual.

SLG connection technique

Since an SLG always occupies two M12 connection sockets on the ASM 450, a prefabricated cable (cf. chapter 3.7) makes it easy to connect the SLG. In its standard version, the connection cable has a length of 2 m. Other cables are available on request.

An SLG plug connector with screw-type terminals is available for users who want to make their own cable. Cable and SLG plug connector can be ordered from the MOBY catalog.



Connector Pin	Core Color	Connection to Pin of SLG connector
1	Green	4
2	White	6
3	Brown	1
4	Yellow	5
5	Gray	3
6	Pink	2
S	Not conn.	-
S	Shield	⏚

Figure 6-26 Connection plug, ASM 450 ↔ SLG (6GT2 090-0BC00)

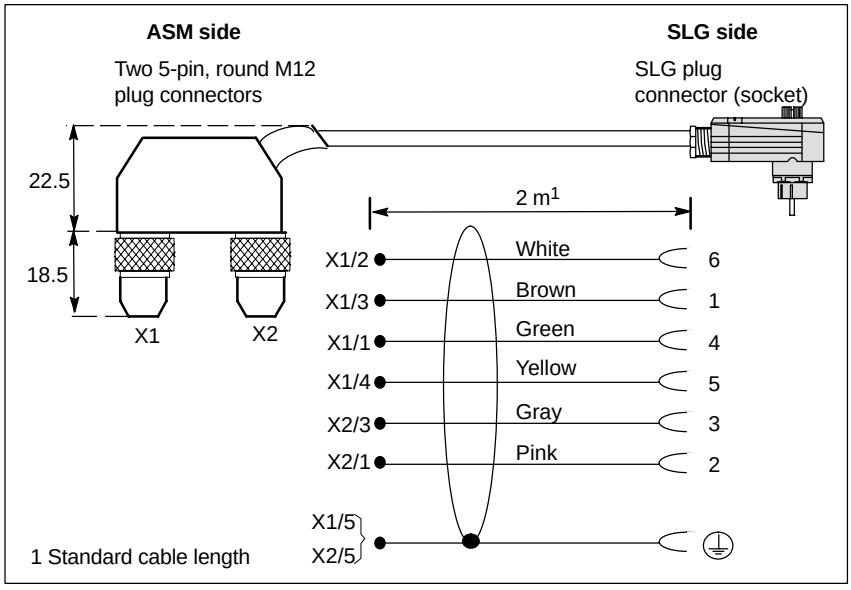


Figure 6-27 Connection cable, ASM 450 ↔ SLG (6GT2 091-1CH20)

SLG and DI/DO configuration for ASM 450

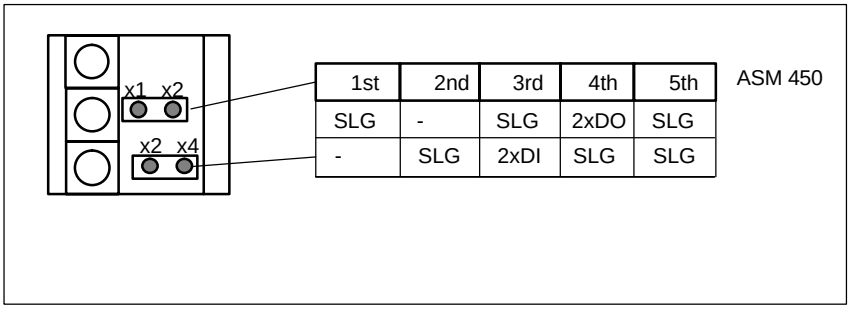


Figure 6-28 SLG and DI/DO configuration for ASM 450

The versions shown in figure 6-28 can be set up with the standard cables of MOBY or ET 200X.

Note

Although the configuration with 2 SLGs + DI + DO is also possible with the ASM 450, the components require special customer-related wiring.

Dimensional drawing of ASM 450 with mounting holes

The following figure shows a dimensional drawing of an ASM 450 with bus connection plugs. You must add the length of the PG screw connection and the radius of the cable used to the total width and depth specified.

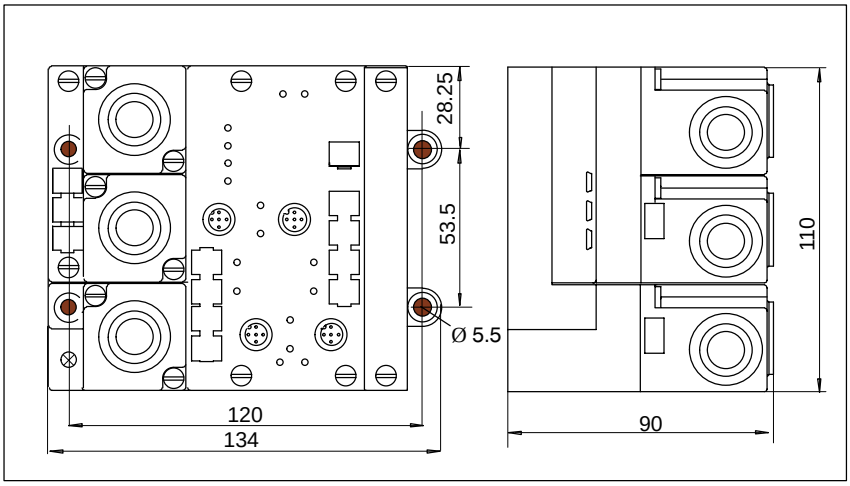
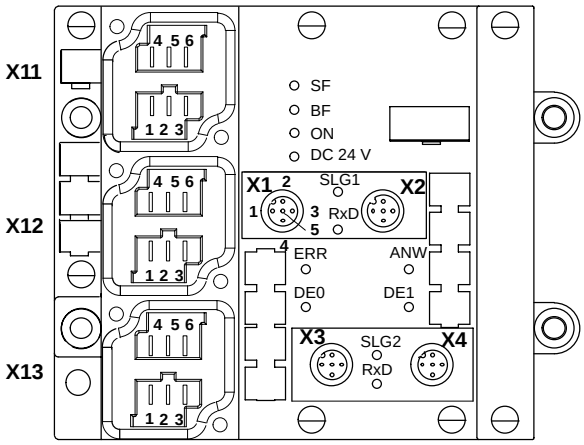


Figure 6-29 Dimensional drawing of the ASM 450

Pin allocation The following figure shows the pin allocation of the ASM 450.



LEDs for PROFIBUS-DP

SF:	System fault (hardware error on ASM 450)
BF:	Bus fault (error on PROFIBUS-DP)
ON:	On when the logic voltage is present on ASM 450 (is generated from the 24 V suply voltage)
DC 24 V:	On when the 24 V supply voltage is connected to ASM 450

LEDs for MOBY

RxD:	SLG active with command
ANW:	MDS present or status of DA1
ERR:	Error indication or status of DA0
SLG1/2:	Indicates the selected SLG. Only SLG 1 or SLG 2 can be selected.
DE0/1 :	Status of the digital inputs

Socket	Pin Allocation	
X11 and X12 (PROFIBUS-DP)	1	Signal B (red)
	2	PE
	3*	PE
	4	Signal A (green)
	5*	L+
	6*	M
X13 (Supply voltage)	1	PE
	2	L+
	3	M
	4	PE
	5	L+
	6	M

* Do not circuit

Socket	Pin Allocation (SLG)		
X1/X3	1	+RxD	
	2	+TxD	
	3	-TxD	
	4	-RxD	
	5	PE	
X2/X4		**X2**	**X4**
	1	+ 24 V	+ 24 V
	2	DA1	DE1
	3	0 V	0 V
	4	DA0	DE0
	5	PE	PE

Figure 6-30 Pin allocation and LEDs of ASM 450

Example for bared lengths

The following figure shows an example of bared lengths. The lengths are valid for all cables which you can connect to the connection plug. Any shield braiding must be twisted, inserted in a core end sleeve, and the excess cut off.

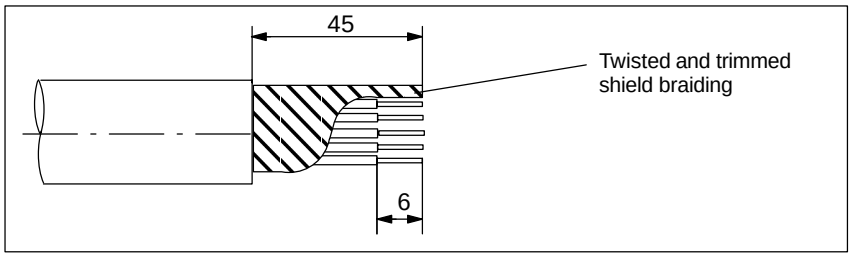


Figure 6-31 Length of baring for a 5-core cable

PROFIBUS address and terminating resistance

The plug plate must be removed from the ASM 450 before you can set the PROFIBUS address or circuit the terminating resistance. The plug plate covers the DIP switches. The following figure shows the location of the DIP switches on the ASM 450 and a sample setting of each.

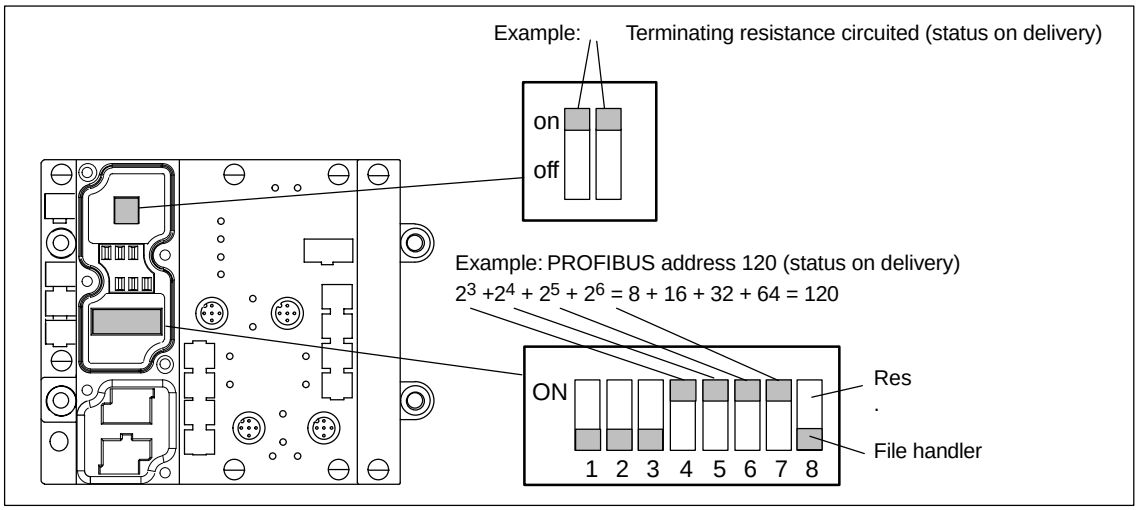

Example:
Terminating resistance circuited (status on delivery)
on
off
Example: PROFIBUS address 120 (status on delivery)
$2^3 + 2^4 + 2^5 + 2^6 = 8 + 16 + 32 + 64 = 120$
ON
1 2 3 4 5 6 7 8
Res
.
File handler

Figure 6-32 Setting the PROFIBUS address and circuiting the terminating resistance

Note

- The PROFIBUS address on the ASM 450 must always correspond to the PROFIBUS address specified for this ASM 450 with the configuration software.
- For correct functioning of the terminating resistance, always switch both DIP switches of the terminating resistance to “On” or “Off”.

6.6 ASM 470

Application area

The ASM 470 interface can be installed in the SIMATIC S7-300 and ET 200M. It can be used for all MOBY systems.

Layout and functions

Up to eight ASM 470 interfaces can be installed and operated in one module rack of the SIMATIC S7-300. When a layout with several module racks (maximum of four) is used, the ASM 470 can be installed and operated in each of these module racks. In a maximum SIMATIC S7-300 configuration, up to 32 ASM 470s can be used.

In multiplex operation, up to two SLGs can be connected to the ASM 470. The FC 47 function ensures simple programming via SIMATIC S7 tools. FC 47 can be used with both the S7-300 and the S7-400. When the S7-400 is used, the ASM 470 is connected via the ET 200M. The ET 200M can also be used to operate the ASM 470 in a SIMATIC S5 environment. FB 47 is available for PLCs 115U to 155U.

Error messages and operational states are indicated with LEDs. On the hardware side, communication between ASM 470 and the S7-300 CPU is handled by a 16-byte address area so that up to 12 bytes of user data can be transferred with each read/write command. Galvanic isolation between SLG and the SIMATIC S7-300 bus ensure layouts which are not as susceptible to interference.

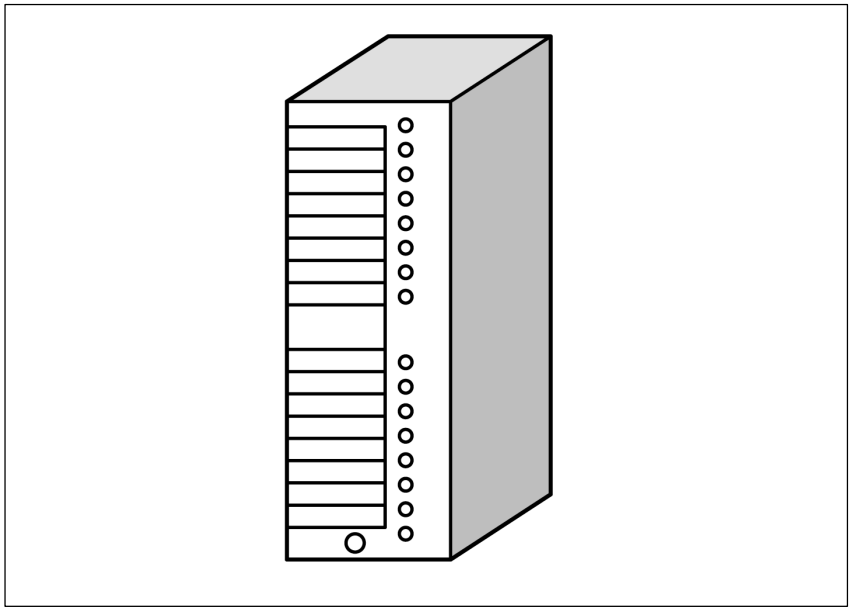


Figure 6-33 ASM 470 interface

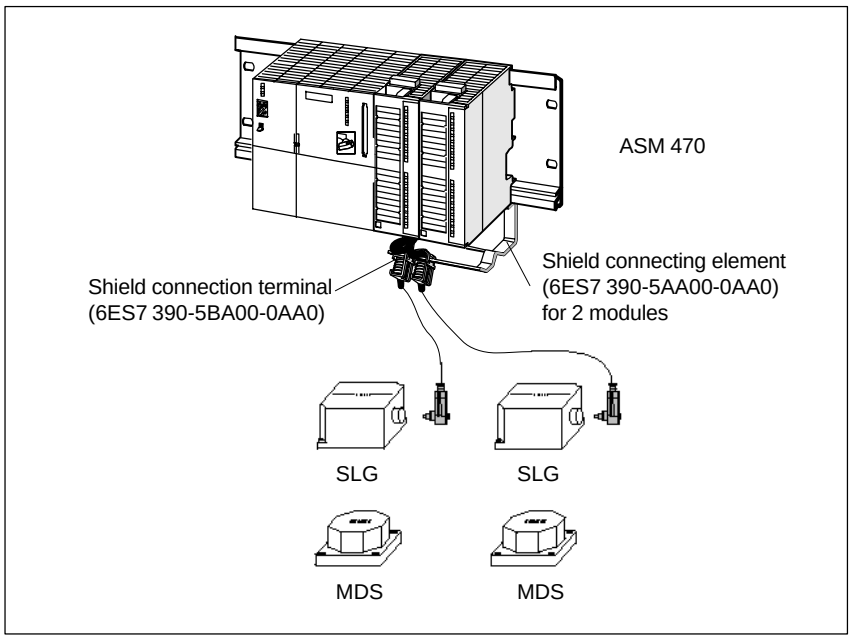


Figure 6-34 Configurator for ASM 470

Ordering data

Table 6-16 Ordering data for ASM 470

Interface ASM 470 for SIMATIC S7-300, without front connector	6GT2 002-0FA10
Accessories	
MOBY software with FC 47, FB 47	6GT2 080-2AA10
Description of ASM 470/FC 47 for MOBY-I	
German	6GT2 097-3AL00-0DA1
English	6GT2 097-3AL00-0DA2
Description of ASM 470/FB 47	
German	6GT2 097-3AL10-0DA1
Englisch	6GT2 097-3AL10-0DA2
Stub lines and accessories	See chapter 7.8.
Front plug connector (1 per ASM 470), 20-pin with screw-type connection	6ES7 392-1AJ00-0AA0
Shield connection terminal (1 per SLG cable)	6ES7 390-5BA00-0AA0
Shield connection element (1 per 2 ASM 470s)	6ES7 390-5AA00-0AA0

Technical data

Table 6-17 Technical data of ASM 470

Serial interface to the SLG	
Connection	Via screw-type terminals The front plug connector is not included. (See catalog ST 70: 6ES7 392-1AJ00-0AA0)
Line length (typ. max.)	1000 m/RS 422, depends on SLG
SLGs which can be connected	SLG 4x
Interface for 24 V DC	Via ASM 470
Software functions	
Programming	With STEP7 function FC 47 or FB 47 for STEP5 (contained in MOBY software)
FC 47 can be used with	S7-300 and S7-400
FB 47 can be used with	S5-115U/135U/155U
Commands	Read data from MDS, write data on MDS, and initialize MDS
Dialog	Yes
Supply voltage	
Nominal value	24 V DC
Permissible range	20 to 30 V DC
Galvanic isolation between S7-300 and MOBY	Restricted (100 kOhm between S7-300 and 24 V DC)
Current consumption	
At U = 24 V DC (max.)	50 mA
From SIMATIC S7 bus (max.)	100 mA
Current consumption of the closed SLGs	Max. of 600 mA for one SLG Max. of 300 mA per SLG when two SLGs are connected
Power loss (typ.)	1 W
Ambient temperature	
During operation	
Horizontal SIMATIC layout	0° to +60° C
Vertical SIMATIC layout	0° to +40° C
During transportation and storage	-40° to +70° C
Dimensions (WxHxD) in mm	40 x 125 x 120
Weight (approx.)	0.2 kg

Wiring

The ASM 470 is commissioned with the following steps.

- Mount module
- Mount module on the S7-300 mounting rail. See S7-300 manual.

Note

The CPU of the S7-300 must be switched to STOP status before the module is mounted.

Warning

The S7-300 may only be wired when the voltage is off.

Front panel

The following figure shows the front plate of the ASM 470 and the inside of the front door with the related connection diagram. The SLGs must be connected to the ASM 470 as shown in the connection diagram.

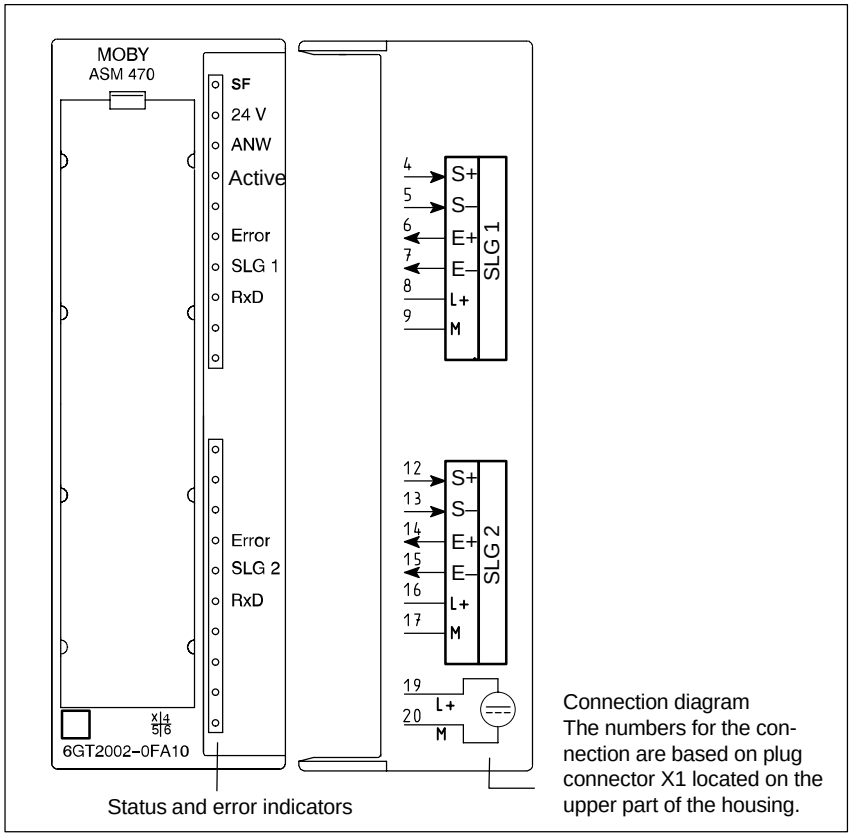


Figure 6-35 Front plate and inside of the front door of the ASM 470

Wiring to the SLG

The figure below shows a connection cable between ASM 470 and SLG. The colors apply to the standard MOBY cable for the ASM 470. See chapter 3.7.3.

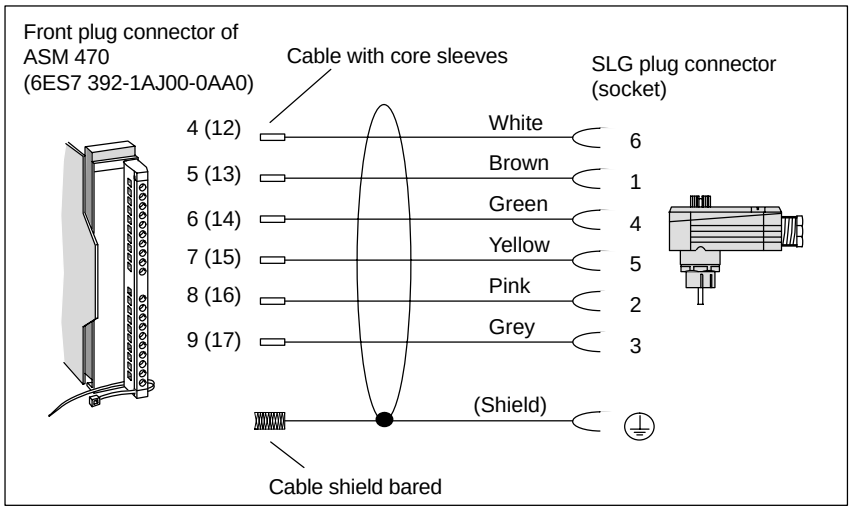


Figure 6-36 Wiring of ASM 470 to SLG

Shield connection

See chapter 3.6.

Lightning protection

Implement the lightning protection and grounding measures required for your application. Lightning protection measures always require individual consideration of the entire system.

Cabling from ASM to SLG

See chapter 3.6.

Configuration of ASM 470 for S7-300 under STEP7

Note

Installation of MOBY requires that functional STEP7 software has been installed on the PC/PG.

Installation and configuration of the ASM 470 in the SIMATIC is handled by an installation program. The installation program is included with the "MOBY software" product (6GT2 080-2AA10).

Installation

Installation is almost completely automatic. The specified steps during SETUP must be responded to.

FC 47 function

During installation, the MOBY project “P7_MO01X” is set up in the directory “S7PROJ”. Using the SIMATIC Manager, the sample MOBY program can be processed or the FC 47 function can be copied to another project.

The ASM 470 module is located in the hardware catalog under the following subdirectory for hardware configuration of the SIMATIC S7.

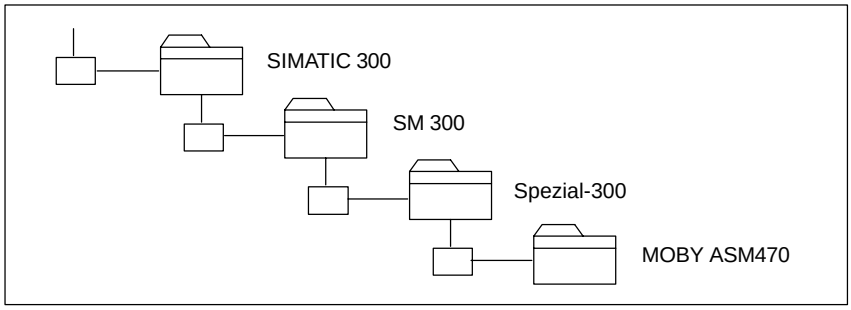


Figure 6-37 ASM 470 directory in the hardware catalog

6.7 ASM 724/ASM 754

Application area

The ASM 724/754 interfaces are designed for the distributed configuration of identification systems for warehousing, logistics, distribution and assembly lines. The robust and functional housing can be mounted almost anywhere. Up to four read/write antennas can be connected and operated in pseudo parallel.
When more than one SLA 71 is connected, the data are processed sequentially on the device.
The MOBY wide-range power pack (6GT2 494-0AA00) can be used to supply the power on the ASM 724 and ASM 754. The read/write antenna (SLA 71) and stub lines must be ordered separately. The user has a choice of two interfaces.

- PROFIBUS-DP/V1 (ASM 754)
- RS 232/RS 422. Serial interface to the PC and PC-compatible controllers (e.g., SICOMP IMC) and to controllers of other manufacturers (ASM 724). Other operating systems on request.

Figure 6-38 ASM 724/754 interface

ASM 724

The ASM 724 accesses the data on the MDS directly with physical addresses. Communication with the user is handled by a serial RS 232/RS 422 interface with the 3964R protocol. This makes it easy to connect PCs and controllers of other manufacturers to the MOBY E identification system. A C-library (MOBY API) with basic functions is available to PC users for their applications (Windows 98/NT 4.0).

ASM 754

The ASM 754 accesses the data on the MDS directly with physical addresses. Communication with the user is handled by the non-cyclic protocol service of PROFIBUS-DP/V1. The FC 45 function is available to SIMATIC S7-300/400 users for simple integration. The description of the PROFIBUS-DP/V1 implementation (see appendix of FC 45 description) is available to programmers of controllers of other manufacturers.

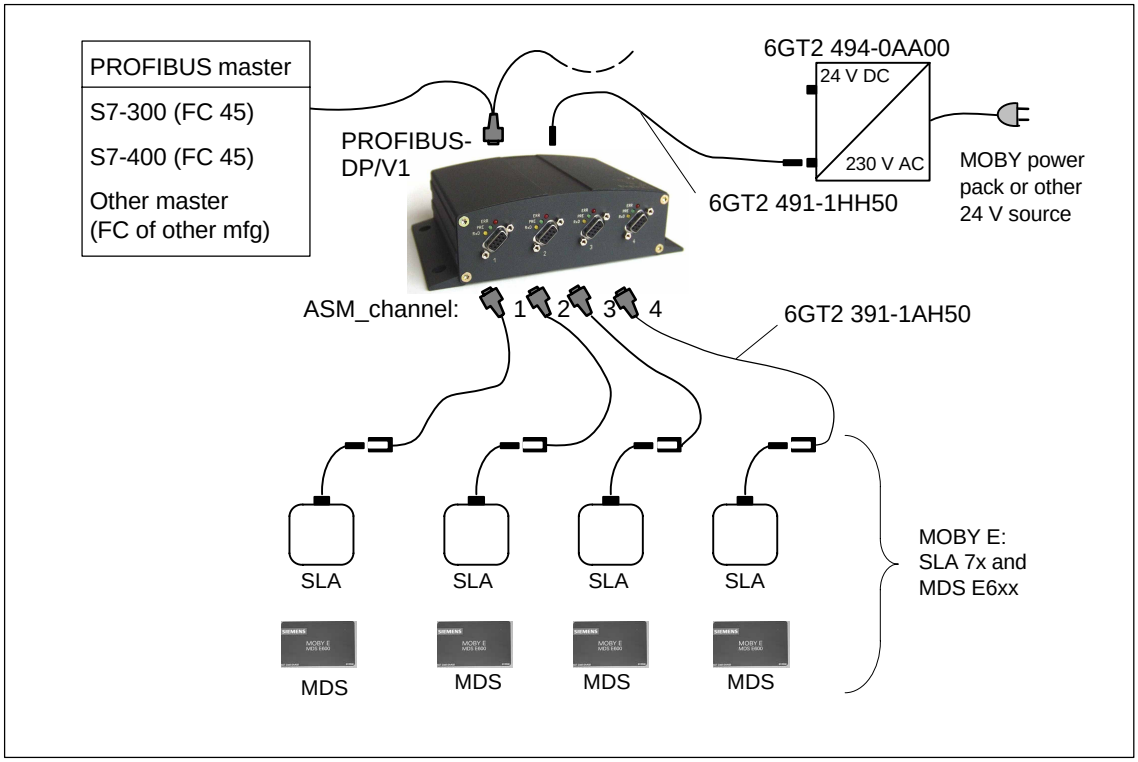


Figure 6-39 Configurator for ASM 724 and ASM 754

Ordering data

Table 6-18 Ordering data for ASM 724/754

ASM 724 interfaces with serial RS 232/RS 422 interface; 3964R procedure for PC, SICOMP and controllers of other manufacturers; for four SLA 71s	6GT2 302-2CE00
ASM 754 interfaces for use of MOBY E components via PROFIBUS-DP/V1, without filehandler; for four SLA 71s	6GT2 302-2EE00
Accessories:	
SLA 71 read/write antenna	6GT2 301-2BB00
Standard connection cable between SLA 71 and ASM 724, and ASM 754; length: 5 m	6GT2 391-1AH50
Extension for antenna cable; 6GT2 391-1AH50; length: 25 m	6GT2 391-1BN25
Wide-range power pack, 100 to 230 V AC/ 24 V DC; 2.2 A (24 V cable not included)	6GT2 494-0AA00
24 V DC stub line for wide-range power pack; 6GT2 494-0AA00; length: 5 m	6GT2 491-1HH50
RS 232 stub line between PC and ASM 724; can be fabricated up to 32 m based on length key (see chap. 3.7.4)	6GT2 391-0B...
Plug connector for voltage (socket) for ASM 724 and ASM 754	6GT2 390-1AB00
PROFIBUS plug connector; 9-pin, submin. D plug connector for 2 stub lines	6ES7 972-0BA11-0XA0 (for other connectors, see catalog ST 70 or IK PI)
Adapter floor plate for top-hat rail mounting of ASM 724/ASM 754	6GT2 390-0BA00
C-library for ASM 724 (MOBY API)	Included on the “MOBY Software” CD (see chap. 7.1)
Description of C-library (MOBY API)	Included as pdf file on the “MOBY Software” CD (see chap. 7.1)
FC 45 for ASM 754	Included on the “MOBY Software” CD (see chap. 7.1)
Description of FC 45 For ASM 754 programming	
German	6GT2 097-3AM00-0DA1
English	6GT2 097-3AM00-0DA2

Technical data

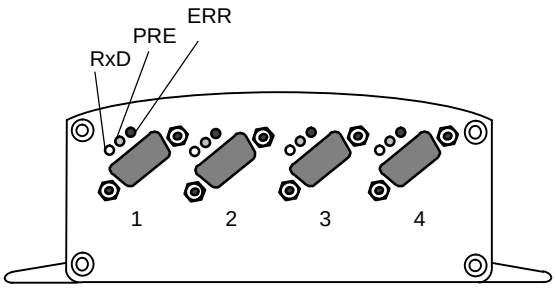
Table 6-19 Technical data of the ASM 724/754

	ASM 754	ASM 724
Serial interface to user	PROFIBUS-DP/V1	RS 232/RS 422
Max. cable length	See PROFIBUS configuration.	30/500 m
Procedure/protocol	EN 50170, vol. 2, PROFIBUS	3964R
Connection	9-pin submin. D socket (screw-type lock)	
Transmission speed	9600 baud to 12 Mbaud (automatic recognition)	38.4 kbaud
Max. block length	4 words (cyclic)/238 bytes (non-cyclic)	238 bytes
Serial interface to the SLA	9-pin, submin. D socket (screw-type lock)	
Cable length (ASM to SLA)	Max. of 55 mm	
No. of SLAs connectable	4 SLA 71 devices	
Software functions		
Programming	Depends on PROFIBUS-DP/V1 master	MOBY API: C-lib. for PC w. Windows 98/ NT 4.0
Function block SIMATIC S7	FC 45	–
MDS addressing	Direct access via addresses	Direct access via addresses
Commands	Initialize MDS, read data from MDS, write data to MDS	Initialize MDS, read data from MDS, write data to MDS
Dialog	No	No
Digital inputs	None	
Digital outputs	None	
Voltage		
Connection plug	4-pin, M12 round plug connector (pin)	
Nominal value	24 V DC	
Perm. range	20 to 30 V DC	
Current consumption	250 mA (without SLA)	
Max. switch-on current	1.1 A (without SLA)	
Ambient temperature		
Operation	–25° to +55° C (no condensation)	
Transportation and storage	–40° to +85° C (no condensation)	
Housing		
Dimensions (L x W x H)	205 x 130 x 60 (without plug connector)	
Material	Aluminum	
Color	Anthracite	

Table 6-19 Technical data of the ASM 724/754

	ASM 754	ASM 724
Mounting Tightening moment (at room temperature)	4 M5 screws Optional: Top-hat rail mounting ≤ 3 Nm	
Weight (approx.) Protection rating	1300 g IP 40 (higher rating on request)	
Shock in acc. w. EN 60721-3-7/ class 7M2 Vibration in. acc. w. EN 60721-3-7/ class 7M2	30 g 1 g (9 to 200 Hz) 1.5 g (200 to 500 Hz)	
MTBF (at +40° C)	$1 \cdot 10^5$ hours	
Certification	CE	

Pin assignment and switches



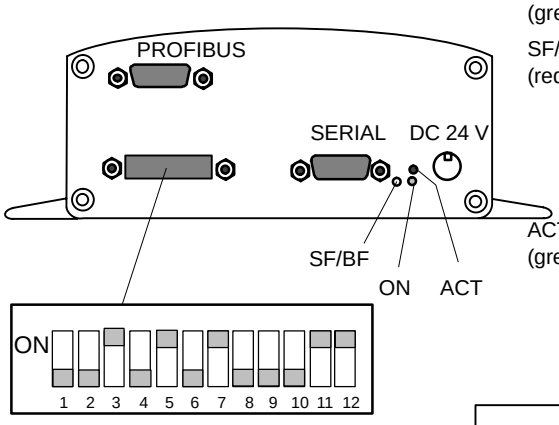
Plug conn. 1 to 4 to the SLA	
Socket	**Designation**
1	+ 12 V
2	+ send
3	+ receive
4	Not used
5	– receive
6	– send
7	Ground (0 V)
8	+ 24 V
9	Not used
Housing	Cable shield

RxD: SLG with command active

PRE: Indication of “presence” channel during multiplex operation

ERR: Error indicated by flashing LED (under preparation)

Figure 6-40 Serial interfaces of ASM 724/754 to SLA 71



ON: (green) 24 V present on ASM

SF/BF: (red) System fault/bus error, RAM error

ASM 724: flashes after switch-on, goes off after first real telegram

ACT: (green) This LED flashes briefly when a command is finished.

Switches 1 to 7: PROFIBUS address[1]

Switch 1 ON: 2^0
Switch 2 ON: 2^1
:
Switch 7 ON: 2^6
Example: PROFIBUS address = 84
($2^2 + 2^4 + 2^6$)

Switches 8: Interface[2]

ON: RS 422
OFF: RS 232

Switches 9: Firmware download

ON: 3964R
OFF: PROFIBUS-DP/V1

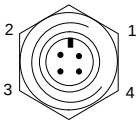
Switches 10: Procedure[2]

ON: 3964R
OFF: Reserved for Lauf

Switches 11, 12: Not used

1 Only for ASM 754
2 Only for ASM 724

24 V DC



Pin	Designation
1	Ground
2	+ 24 V
3	+ 24 V
4	Ground

PROFIBUS [1]

Socket	Designation
1	Not used
2	Not used
3	B–line (red)
4	Request to send (RTS)
5	Ground 5 V (M5)
6	Potential 5 V (floating; 60 mA)
7	Not used
8	A-line (green)
9	Not used
Housing	Cable shield

SERIAL [2]

Socket	RS 232	RS 422
1	Not used	Not used
2	TxD (send)	–TxD
3	RxD (receive)	–RxD
4	Not used	Not used
5	Ground (0V)	Ground
6	Not used	Not used
7	Not used	Not used
8	Not used	+TxD
9	Not used	+RxD
Housing	Cable shield	Cable shield

Figure 6-41 Serial interfaces of the ASM 724/754 to the user

Dimensions (in mm)

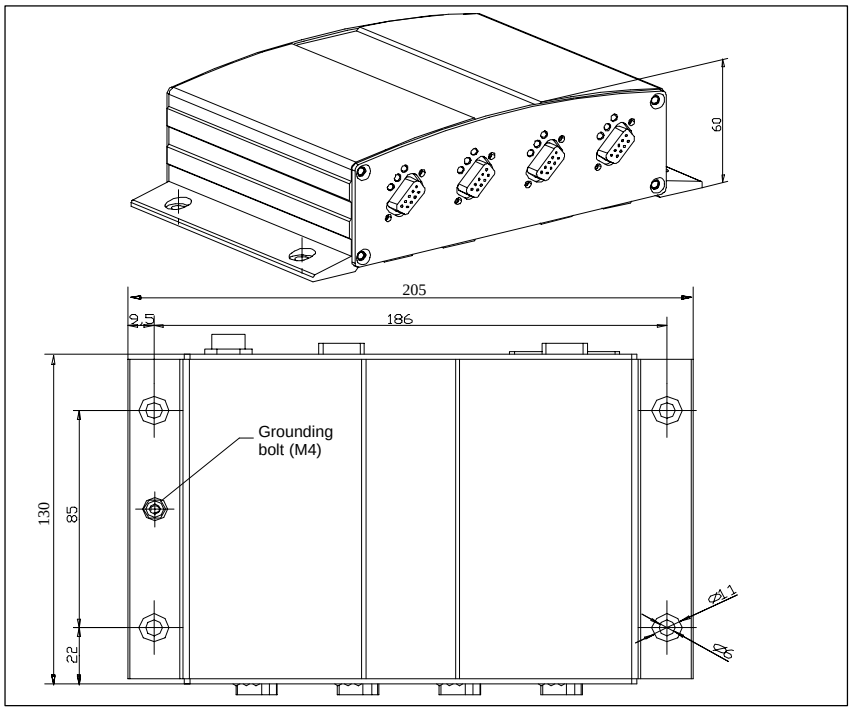
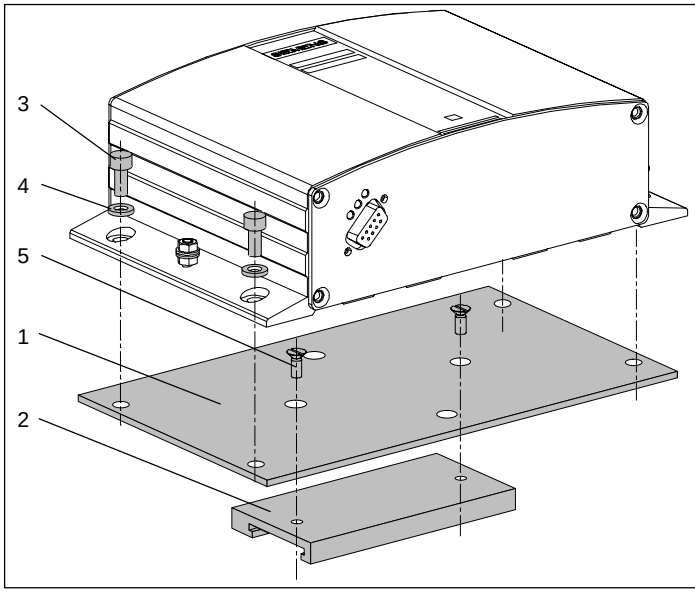


Figure 6-42 Dimensional drawing of ASM 724/754 with mounting holes

Adapter floor plate for top-hat rail mounting



Item	Designation	Quantity
1	Floor plate	1
2	Profile section	1
3	Oval head screw (M5 x 10)	4
4	Washer (A5.3)	4
5	Countersunk screw (M4 x 10)	2

Figure 6-43 How to mount the adapter plate

Note

The profile section (item 2) can be turned by 90° on the floor plate before mounting if the situation requires.

6.8 SIM Serial Interface Module

6.8.1 Overview

Application area

The primary application areas of the MOBY E SIM are data acquisition, trade and commerce, warehousing, logistics, assembly lines and tool identification. For acquisition support, development and pilotinstallation, the MIFARE Demokit is availabe.
The SIM serial interface module is a general-purpose module for operation of MOBY E via a serial interface on any

- Computers
- PCs
- PLCs of other manufacturers

Its sturdy housing permits use in rugged environments and makes it insensitive to many chemical substances.

Layout and function

SIM combines an ASM interface and an SLG read/write device in one housing. It is delivered with RS 232 and RS 422 interfaces.

The following versions are available for MOBY E.

- SIM 70 ANT 0
- SIM 70 ANT 1
- SIM 72

All SIM models are operated with a 3964R procedure.

The SIM is connected via a serial interface of the PC (models with processors starting at 80486SX) and run with the 3964R protocol. Driver software is available for the 3964R protocol. C libraries with functions based on the 3964R driver platform are available for fast and easy programming.

Use of the C libraries makes it possible to run the SIM with applications under Windows 95/98/NT 4.0.
Other operating systems on request.

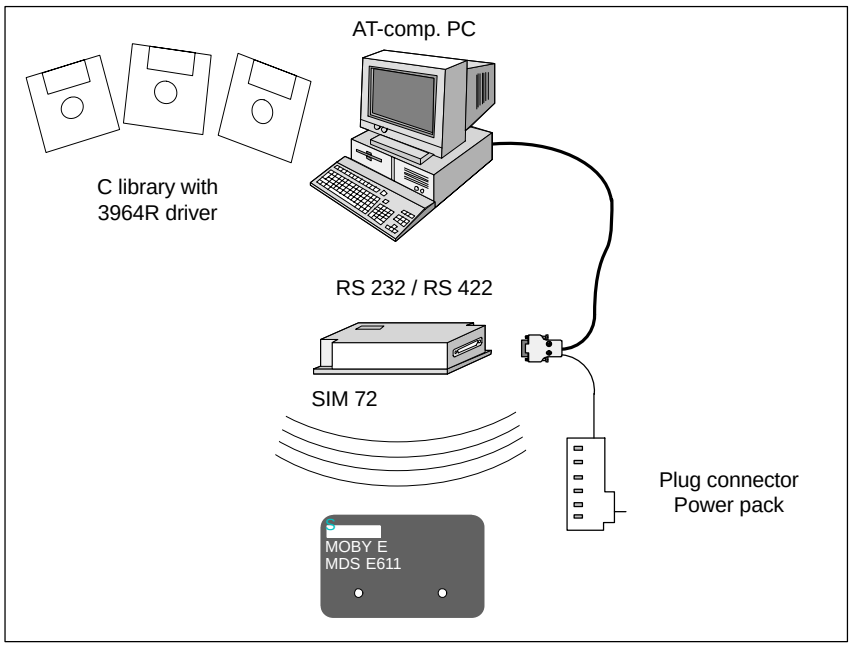


Figure 6-44 Example of a configurator for SIM

Data structure of the MOBY E data memory MDS E6xx with SIM

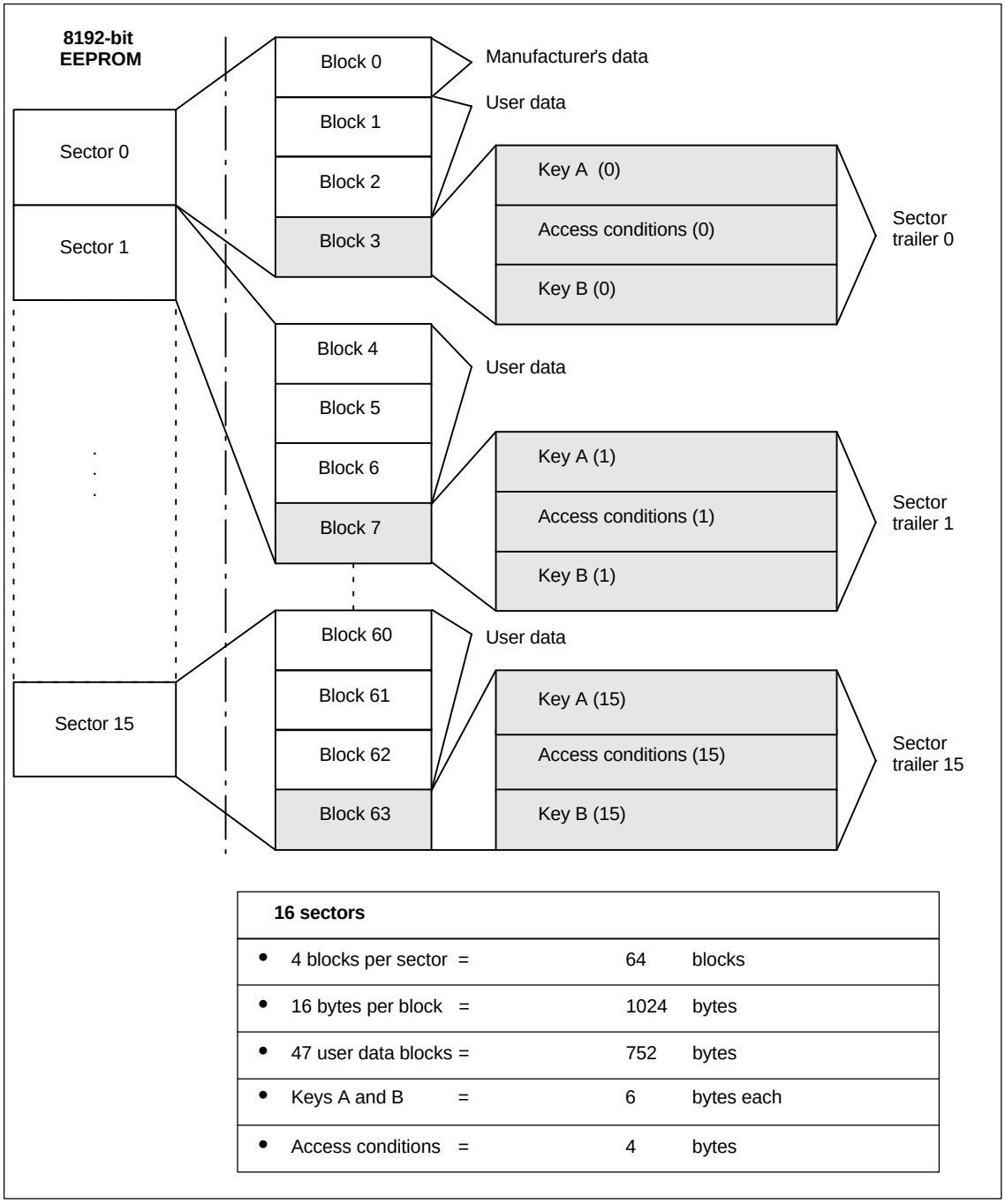
MOBY E MDS E6xx data memories and the MIFARE® card share the same protocol but use different access keys.
The MDS has an 8-kbit EEPROM memory which is divided into 16 sectors (i.e., sectors 0 to 15). Each sector consists of four blocks. The block is 16 bytes in length and is the smallest addressable memory area on the MDS. With one exception, each sector consists of three blocks of user data (i.e., blocks 0 to 2) and a sector trailer (i.e., block 3). Sector 0 is the exception. It contains the card manufacturer data block in block 0 and can only be read-accessed.

Access to the MOBY E MDS is protected by two keys (i.e., A and B) per sector with individual access conditions for each block of the sector. These keys and the individual access conditions must be specified and stored in the appropriate sector trailer when the card is personalized.

With MOBY E data memories, key A is reserved and is not available for programming. All MOBY E SIMs use this key.
Key B is available for user programming. This permits the SIM to be used to access general MIFARE data memories. The transport key is required to switch the SIM to another B key. This is 0xB0B1B2B3B4B5.

Note

Key assignment and access conditions can only be changed with the SIM.



16 sectors			
• 4 blocks per sector	=	64	blocks
• 16 bytes per block	=	1024	bytes
• 47 user data blocks	=	752	bytes
• Keys A and B	=	6	bytes each
• Access conditions	=	4	bytes

Figure 6-45 Data structure of the MOBY E MDS (MIFARE®) with SIM

The MOBY interfaces which use an SLG with the MDS (e.g., ASM 400, ASM 450, ASM 470, and so on) **only** access the user data via addresses. The figure below shows the assignment of ASM addressing to the block structure of the MDS.

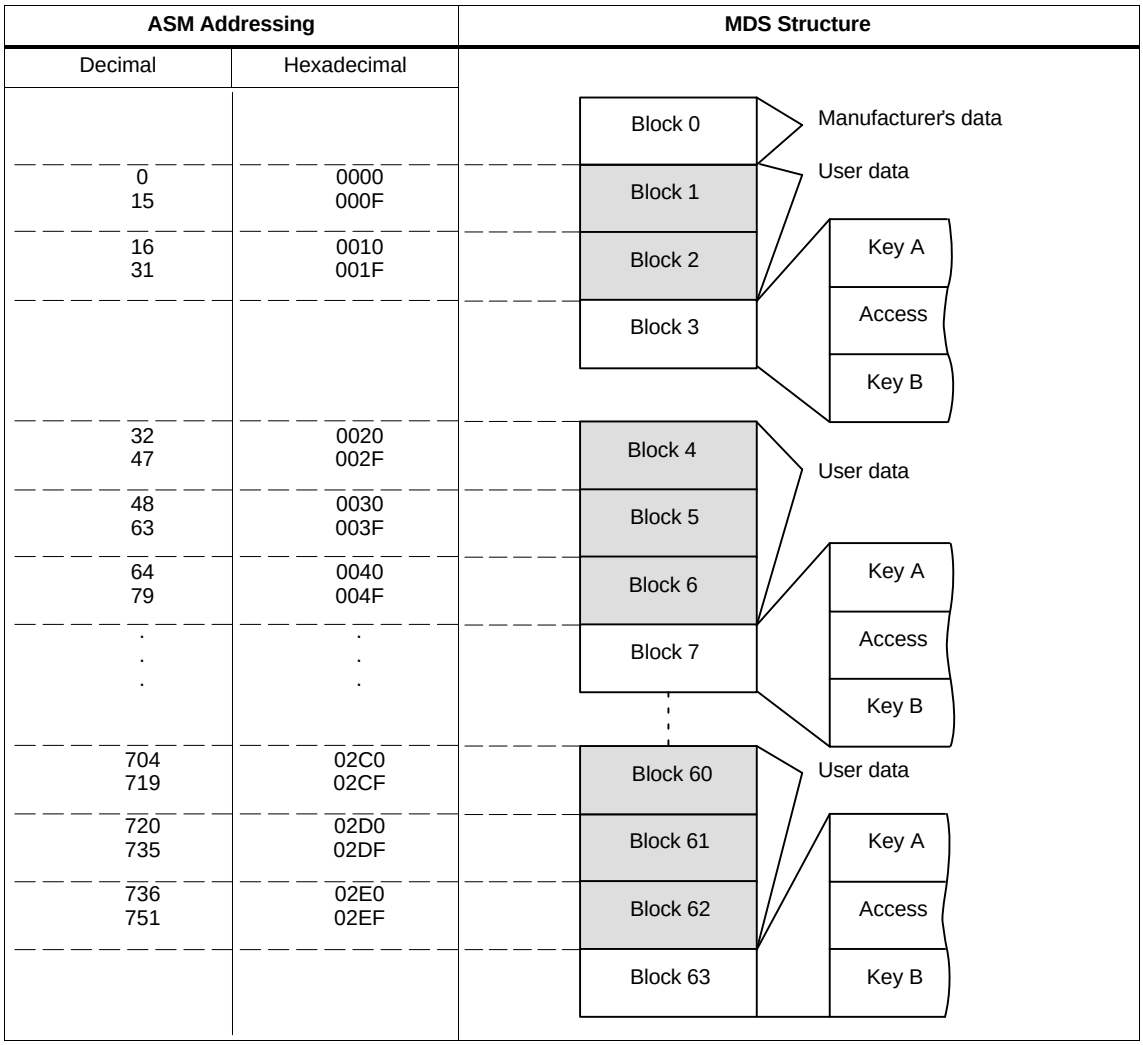


Figure 6-46 Assignment of the ASM addressing to the block structure of the MDS

Field data of the MDS and SIM

The following tables provide the field data of all MOBY E components of MDS and SIM.

All technical data are typical data, based on an ambient temperature of 0° to +50° C, a supply voltage of 22 to 27 V DC, and metal-free surroundings. **Due to manufacturing and temperatures, tolerances of ± 20% are permitted.**

The field data are subject to additional tolerances when the entire voltage range on SIM from 12 to 30 V DC and/or the entire temperature range of MDS and SIM is/are utilized.

Table 6-20 Field data of all MDSs and SIMs without the influence of metal

MDS / SIM		MDS E600	MDS E611	MDS E623[3]	MDS E624
Length of the transmission window in mm (L)					
SIM 70 ANT 0	(L_d)	---	---	4	12
SIM 70 ANT 1	(L_d)	60[5]	80[5]	---	38
SIM 72	(L_x)[2] (L_y)[2]	75[5] 50[5]	90[5] 60[5]	---	60 40
Width of the transmission window in mm (W)					
SIM 70 ANT 0		---	---	2[4]	5 (12)[1]
SIM 70 ANT 1		24	32	---	15 (38)[1]
SIM 72	(B_x)[2] (B_y)[2]	30 20	36 24	---	24 16
Working distance in mm (S_a)					
SIM 70 ANT 0		---	---	0 to 6	0 to 8
SIM 70 ANT 1		0 to 50	10 to 70	---	0 to 25
SIM 72		0 to 50	10 to 70	---	0 to 30
Limit distance in mm (S_g)					
SIM 70 ANT 0		---	---	6	15
SIM 70 ANT 1		70	100	---	40
SIM 72		70	100	---	40

1 The width (W) contained in parentheses only applies to static MDS operation.
2 See also figure 6-64 for field geometry.
3 MDS E623 with SIM 70 ANT 0 only in static operation
4 In static operation, a maximum medien deviation of $\pm$ 2 mm is permitted.
5 Reduction by approx. 15% when the MDS enters the transmission window diagonally. See also figure 3-1.

Note

For effects of metal on the transmission window, see sections 3.4.2 and 3.4.3.

Table 6-21 Minimum distance from MDS to MDS

	MDS E600	MDS E611	MDS E623	MDS E624
SIM 70 ANT 0	---	---	> 30 mm	> 50 mm
SIM 70 ANT 1	> 400 mm	> 400 mm	---	> 250 mm
SIM 72	> 400 mm	> 400 mm	---	> 250 mm

Table 6-22 Minimum distance from SIM to SIM

	SIM 70 ANT 0	**SIM 70 ANT 1**	**SIM 72**
SIM 70 ANT 0	> 200 mm	> 400 mm	> 400 mm
SIM 70 ANT 1	> 400 mm	> 800 mm	> 800 mm
SIM 72	> 400 mm	> 800 mm	> 800 mm

Note

Adherence to the values specified in table 6-22 is essential. The inductive fields may be affected if the values are underranged (i.e., data transmission time would increase to an incalculable amount of time or a command would be aborted with errors).

6.8.2 Cable and Plug Connector Allocation

The 15-pole submin D plug connector (i.e., pin) is used for the following purposes.

- The voltage supply of SIM
- The connection to the PC/computer
- The connection of the inputs and outputs

Table 6-23 Overview of the SIM plug connector allocation

Pin	Meaning	
	RS 232 Interface	**RS 422 Interface**
7	–	D + (Send)
8	–	E + (Receive)
14	TxD (Transmit Data)	D - (Send)
15	RxD (Receive Data)	E - (Receiveg)
13	GND (Signal ground)	GND[6] (Connect signal ground if necessary.)
12	I1 [1 5] (Input for interface switchover only)	I1 [1 5] (Input for interface switchover only)
1	+ 24 V	
9	0V (ground) Voltage supply of the SIM module (12 to 30 Volt)	
2	Not used	
10	0V (ground) For power output	
11	DPA0 [3 4] (Power output 24 V, max. of 0.5 A ohmic load)	
4	0V (ground) For DO	0V (ground) For DO
5	DI0 [1]	DI0 [1]
3	DO0 [2 3]	DO0 [2 3]
6	DO1 [2]	DO1 [2]
7	DO2 [2] (Only for RS 232)	——

1 Logical “0”: –2 V < log 0 < 5 V /logical “1”: 12 V < log 1 < 33 V
2 Level and load correspond to RS 232; $R_{i\ min}$ = 3 kΩ (logical “0” = < –5 V on 3 kΩ / logical “1” = ≥ 5 V on 3 kΩ)
3 Output DPA0 and DO0 are parallel in function.
4 Logical “0”: < 2 V on 50 Ω / logical “1”: 22 V on 50 Ω
5 Interface switchover RS 232: I1 = logical 0/RS 242; I1 = logical 1
6 Correct recognition requires that GND-SIM and GND-PC be connected with each other.

Suggested cabling

Shielded data cables must be used.
Standard cable recommended by Siemens: LiYC11Y, shielded

Wiring varies depending on the ambient conditions and the cable lengths.

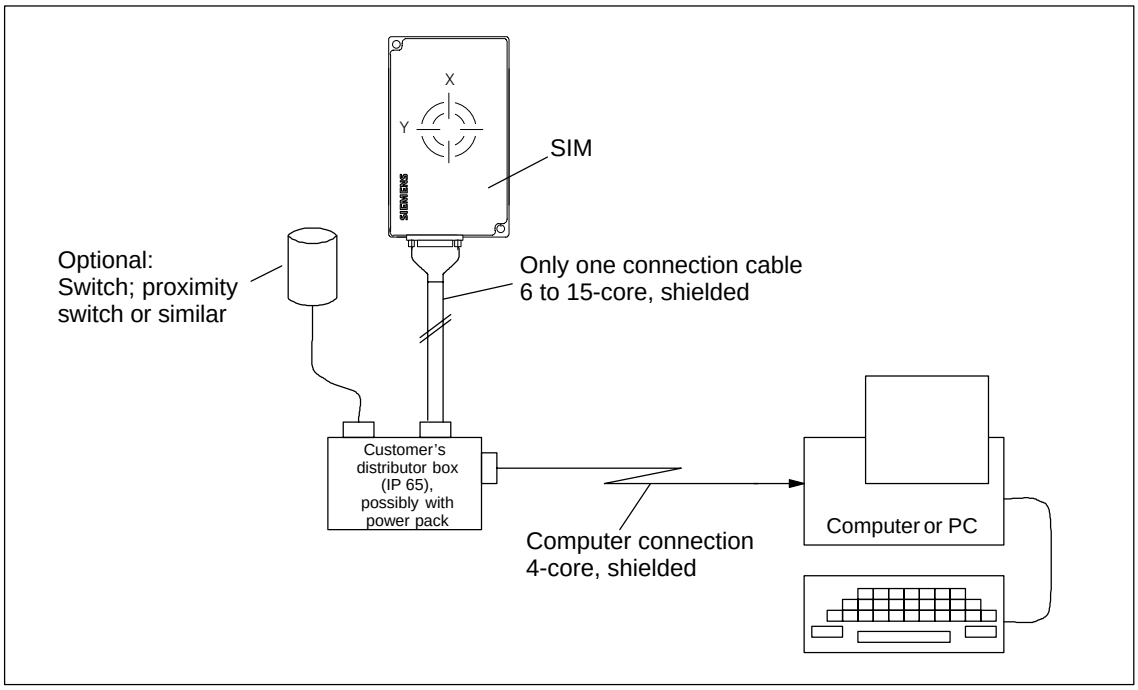


Figure 6-47 Installation with one connection cable for rugged environments

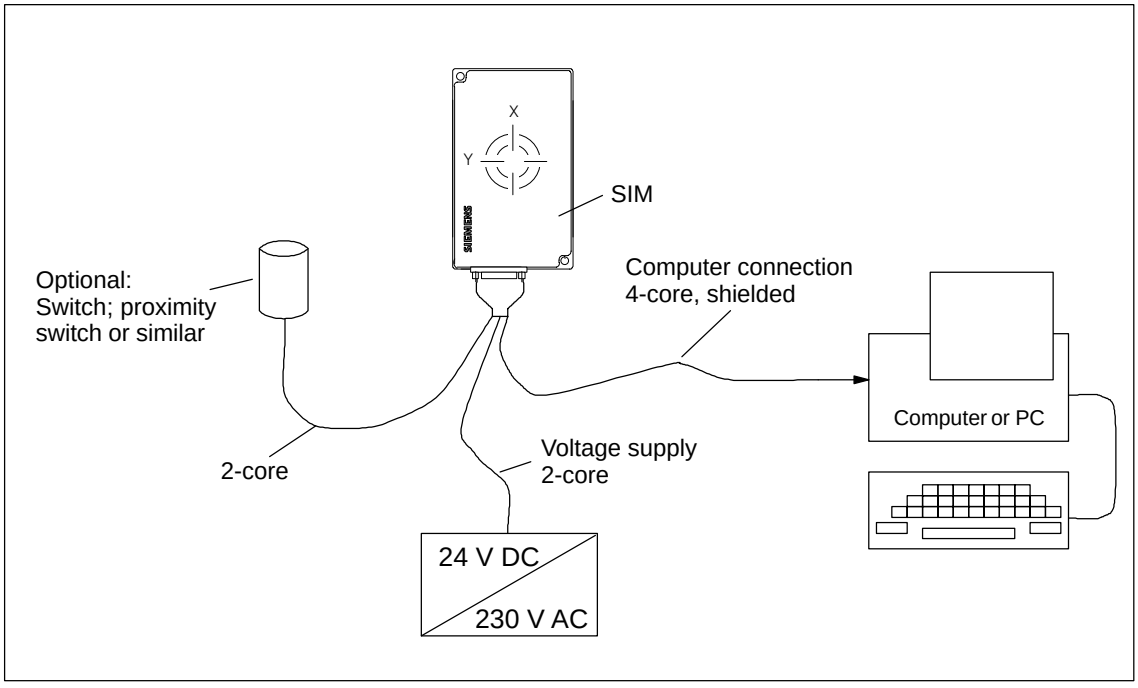


Figure 6-48 Installation with several connection cables on the SIM plug connector

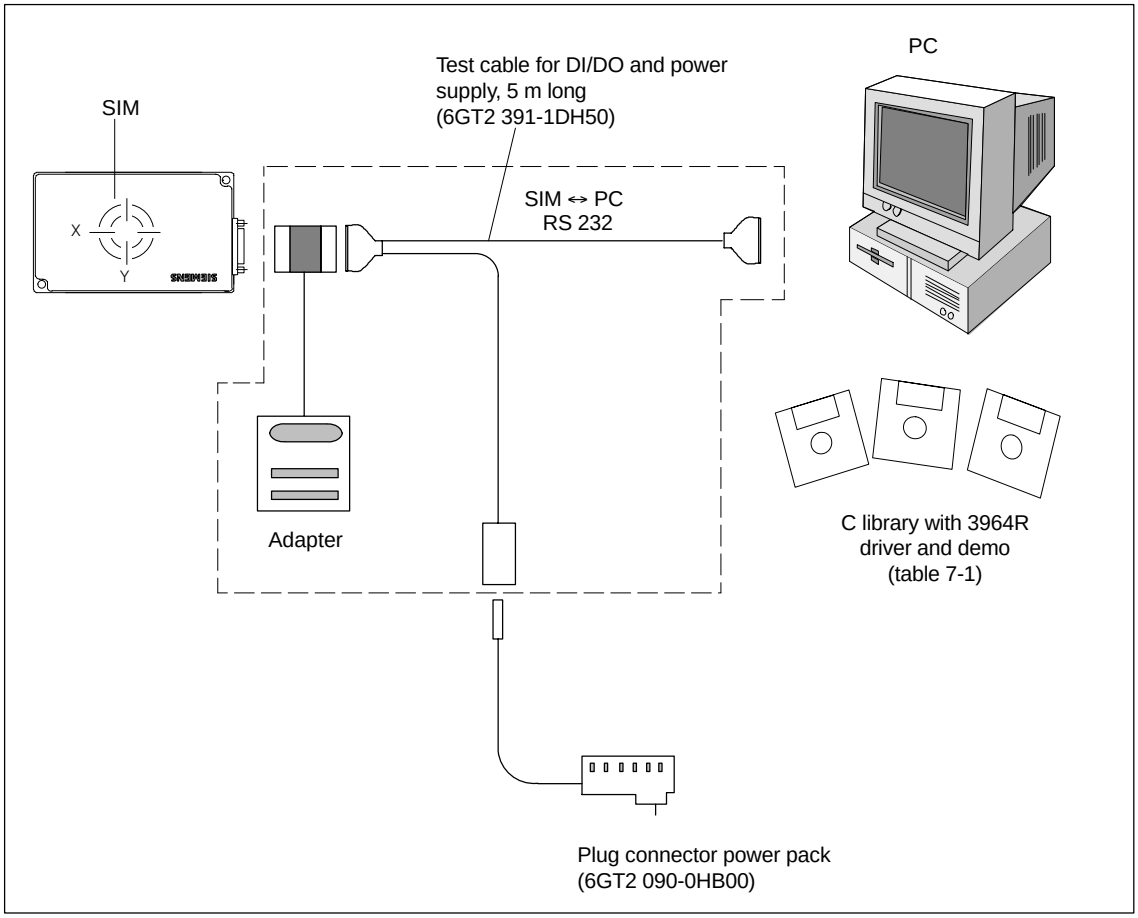

PC
Test cable for DI/DO and power supply, 5 m long (6GT2 391-1DH50)
SIM
SIM ↔ PC RS 232
X
Y
Adapter
C library with 3964R driver and demo (table 7-1)
Plug connector power pack (6GT2 090-0HB00)

Figure 6-49 Installation with test cable and plug connector power pack (see chap. 3.7.3)

Voltage supply

Table 6-24 Voltage supply of SIM

Nominal Value	24 V DC		
Permissible range	12 to 30 V DC U_{ripple} f_{ripple} 1 V_{ss} $0 < f < 1$ MHz (measured on plug connector of SIM)		
Current consumption			
Startup current			700 mA
At 24 V and room temperature	Without	DO	180 mA
	With	DO	700 mA
At 12 V and room temperature	Without	DO	330 mA
	With	DO	1.03 A

The voltage can be supplied via cores of the data cable or via a separate cable. Remember the voltage drop on the supply cable, and check the input voltage on SIM during commissioning.

The permissible cable length is usually shorter than 1000 m. The length depends on the current consumption of SIM and the ohmic resistance of the connection cable.

The following table provides an overview of permissible cable lengths.

Table 6-25 SIM cable configuration

Conductor Cross Section in mm^2	**Conductor Diameter in mm**	**Resistance in Ω/km [1]**	**Max. Cable Length in m^2**	
			DO Unloaded	**DO Max. of 500 mA**
0.07	0.3	550	40	30
0.2	0.5	185	120	85
0.5	0.8	70	310	230
0.8	1.0	50	440	320
1.5	1.4	24	920	660

1 The resistance values are average values. They refer to the forward and return conductors. A single wire has half the resistance.

2 Use of these conductor cross sections requires crimp contacts (not included) in the SLG connection plug.

Field with gray background:

Recommended by Siemens: Standard cable, LiYC11Y (e.g., 6 x 0.25, shielded). The cable is available from Siemens under the order number 6GT2 090-0A...

Standard cabling with RS 232 interface

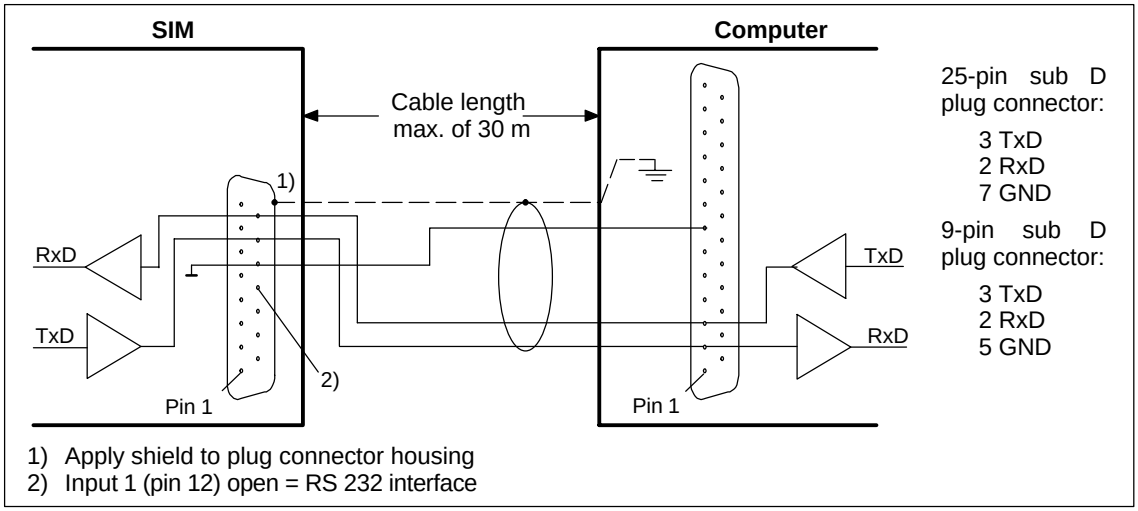


Figure 6-50 Standard cabling for computer/SIM and RS 232

SIM is equipped with a standard RS 232 (V.24) interface with the signal lines on pins 14 and 15.
V.24 control lines (e.g., DSR, DTR, RTS and CTS) are not supported by SIM. Data acknowledgment is performed at the procedure level.

Standard cabling with RS 422 interface

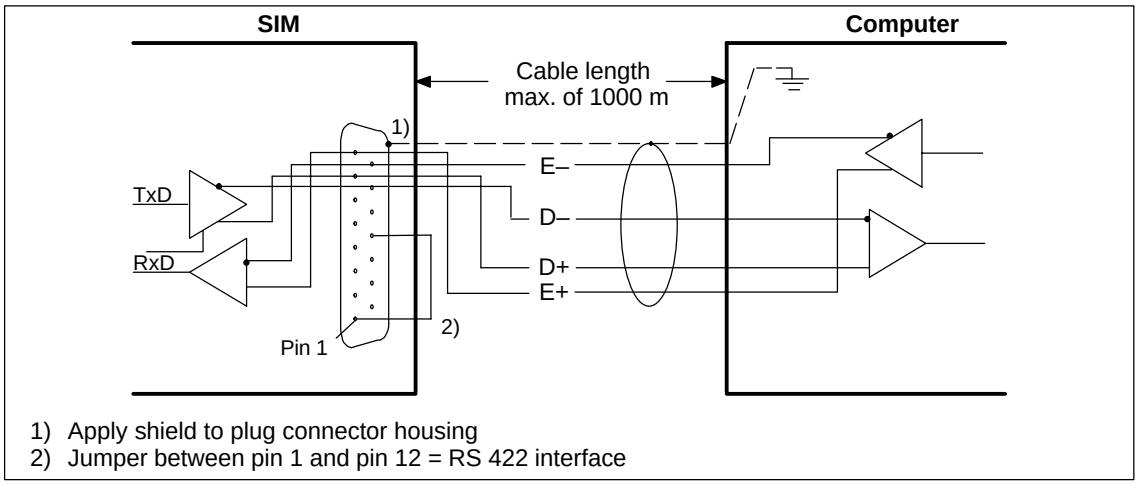
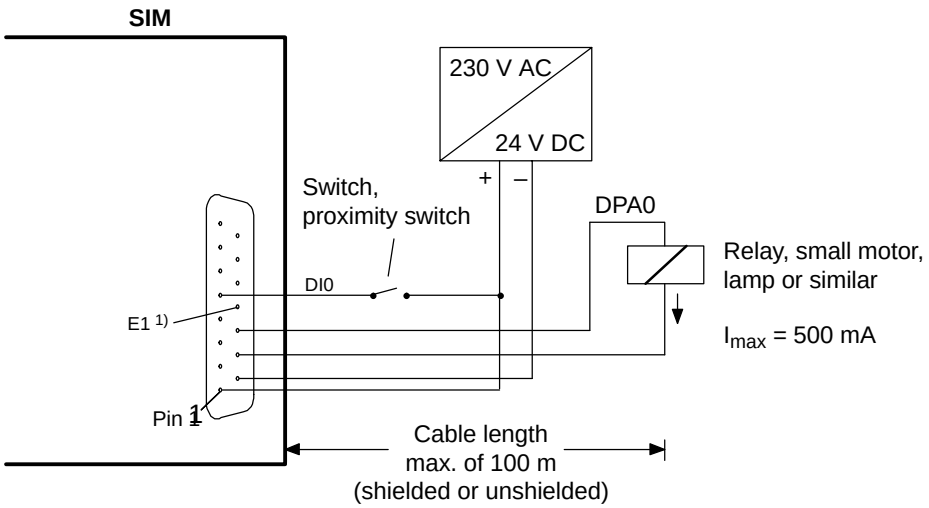


Figure 6-51 Standard cabling for computer/SIM and RS 422

Input I1 (pin 12) is used to switch from interface RS 232 to RS 422.
Logical 0 is RS 232.
Logical 1 is RS 422.

DI/DO cabling with voltage supply and interface switch-over



1) Input 1 (pin 12) is only used for the interface switchover and is not available to the user for applications.
Logical 0 is RS 232.
Logical 1 is RS 422.

Figure 6-52 DI/DO cabling with voltage supply

Warning

If DPA0 (i.e., power output) is used, PIN 10 must be used as ground reference. Otherwise the SIM may be destroyed.

What to do if nothing works

a) Check supply voltage directly on the SIM plug connector with a measuring device.

b) Check cabling to the computer.

- Do SIM and computer have the same physical interface?
- Is the polarity of the connection cables (i.e., RS 232 or RS 422) correct?
- Are the data cables wired correctly?
  RxD of SIM must be connected to TxD of the computer and vice versa.
- Is the cable shield applied correctly?

Error messages

Error messages are described in the individual programming guides.

6.8.3 Programming the SIM Module with the 3964R Procedure

Telegrams can only be transmitted with the 3964R procedure. This procedure ensures secure data transmission for a point-to-point connection.

The following C libraries and programming guides which can be ordered separately are available to the user for the computers.

C libraries

- CCT32 (Windows 95/NT 4.0)
- MOBY API (Windows 98/NT 4.0)

Programming guide for

- CCT32 (Windows 95/NT 4.0), German
- CCT32 (Windows 95/NT 4.0), English
- MOBY API (Windows 98/NT 4.0 on the “MOBY Software” CD as pdf file)

MOBY API is a C-library with only the basic functions (read, write, initialize). It is available to users for their PC application.

PC users:
3964R driver for Windows 95/98/NT 4.0 users; uses PC interfaces 1 and/or 2. With additional hardware, 4 interfaces can be operated with the driver. Can be run on PC models starting with processor 80486SX with serial interface and a Windows 95/98/NT 4.0 operating system.

The communication specifications are described in the Windows programming guidelines (CCT32, Windows 95/NT) for computers which do not use Windows (e.g., Unix).

Interface presetting

Parameter	Presetting
Transmission speed	9600 bit/sec
Bits per character	8 data bits
Parity	Odd
Stop bits	1
Priority	PC = master

Depending on the operating system being used, these interface parameters must be set in the C-library via system control (for Windows 95/NT, button: 3964R/Lauf).

6.8.4 SIM 70 ANT 0

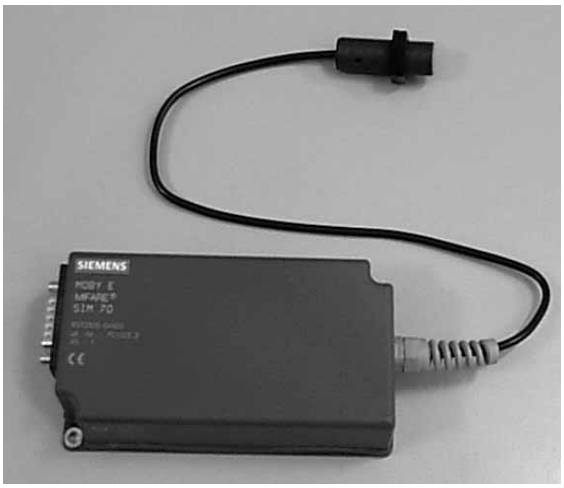


Figure 6-53 SIM 70 ANT 0

Ordering data

Table 6-26 Ordering data for SIM 70 ANT 0

Serial interface SIM 70 ANT 0	6GT2 305-0AA00
15-pole submin D special plug connector (socket) for IP 65	6GT2 390-1AA00
SIM-RS 232 test cable with connection line for DI/DO and connection for power supply (total length of 5 m)	6GT2 391-1DH50
Plug-in power pack, primary: 90 V to 264 V AC secondary: 24 V DC/1250 mA for SIM-RS 232 test cable	6GT2 090-0HB00
Software	See section 7.1
Programming guide	See appendix A

Technical data

Table 6-27 Technical data of SIM 70 ANT 0

Serial interface	RS 232 and RS 422
Transmission speed	9600 baud
Procedure	3964R (C library contains driver for PC)
Plug-in connection	15-pole submin plug connector (pin on device side)
Data line length, max.	1000 m (shielded), RS 422 30 m (shielded), RS 232
Antenna line length, max.	0.45 m

Table 6-27 Technical data of SIM 70 ANT 0

Software functions	MDS: Read, write, initialize, access rights, multitag (see programming guide)
Programming	Depends on computer, PC, PLC of other manufacturer
The following C libraries are available for the PC.	CCT32 (Windows 95/NT 4.0) MOBY API (Windows 98/NT 4.0)
Digital input (R_i = 10 kΩ)	Via 15-pole submin D plug connector
Number	1
Input voltage for Logical “0” Logical “1”	 – 2 V < log 0 < 5 V [1] 12 V < log 1 < 33 V [1]
Non-floating	Yes
Digital outputs	Via 15-pole submin D plug connector
Number	1 (power output) I_{max} = 500 mA At 24 V (output voltage of 22 V)
Input voltage for Logical “0” Logical “1”	 < 2 V at 50 Ω 22 V at 50 Ω (I_{max})
Galvanic isolation	No
Short-circuit proof	Yes
Inductive interface to the MDS (SLG integrated)	
Read/write distance, max	15 mm (see field data)
Transmission frequency	13.56 MHz
Supply voltage Nominal value Permissible range	 24 V DC 12 to 30 V DC [1]
Current consumption at room temperature Without DO Switchon current, brief Operation (at 12 V) Operation (at 24 V)	 700 mA, typical 330 mA, typical 180 mA, typical
MTBF (at +40 ° C)	2.5 x 10^5 hours
Housing, dimensions in mm	
For antenna head (∅ x weight x length)	M18 x 1.5 x 50
For electronics without plug connector (L x W x H)	160 x 80 x 40
Color (Antenna) (SIM housing)	Anthracite with orange head Anthracite
Material (Antenna) (SIM housing)	Crastin Polyamide 12

Table 6-27 Technical data of SIM 70 ANT 0

Protection rating in acc. w. EN 60529	
SIM housing	IP 65 (with special plug connector, 6GT2 390-1AA00)
Antenna	IP 67 (front)
Vibration in acc. w. EN 60721-3-7, class 7M2	1 g (9 to 200 Hz)[2] 1.5 g (200 to 500 Hz)[2]
Shock in acc. w. EN 60721-3-7, class 7M2 Total shock response spectrum, type II	30 g[2]
Mounting of the SIM	2 M5 screws
Tightening moment (at room temperature)	≥ 2 Nm
Mounting of the antenna	2 plastic nuts, M18 x 1.5
Ambient temperatur	
During operation	-25° C to + 70° C
During transportation and storage	-40° C to + 85° C
Weight, approx.	510 g

1 Voltage measured on SIM

2 **Warning:** The values for shock and vibration are maximum values. They should not be allowed to occur on a continuous basis.

Definition of distance D

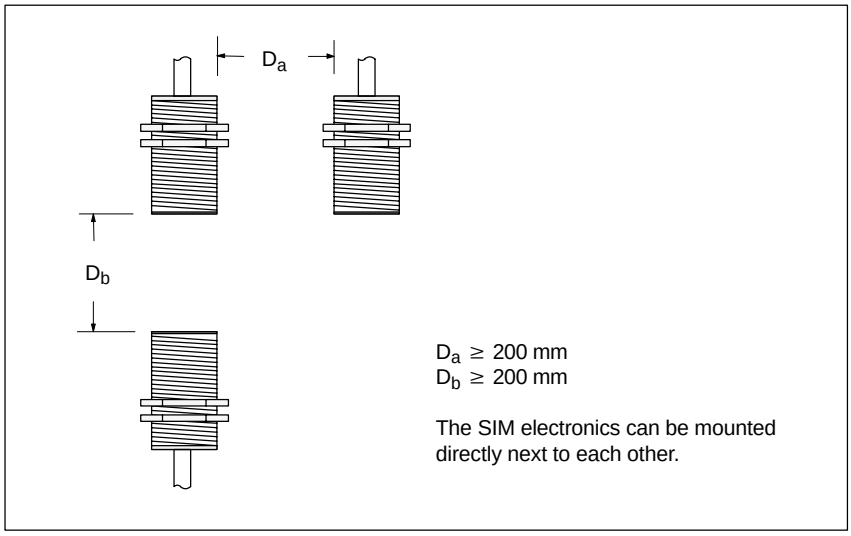


Figure 6-54 Distance D: SIM 70 ANT 0

Dimensions (in mm)

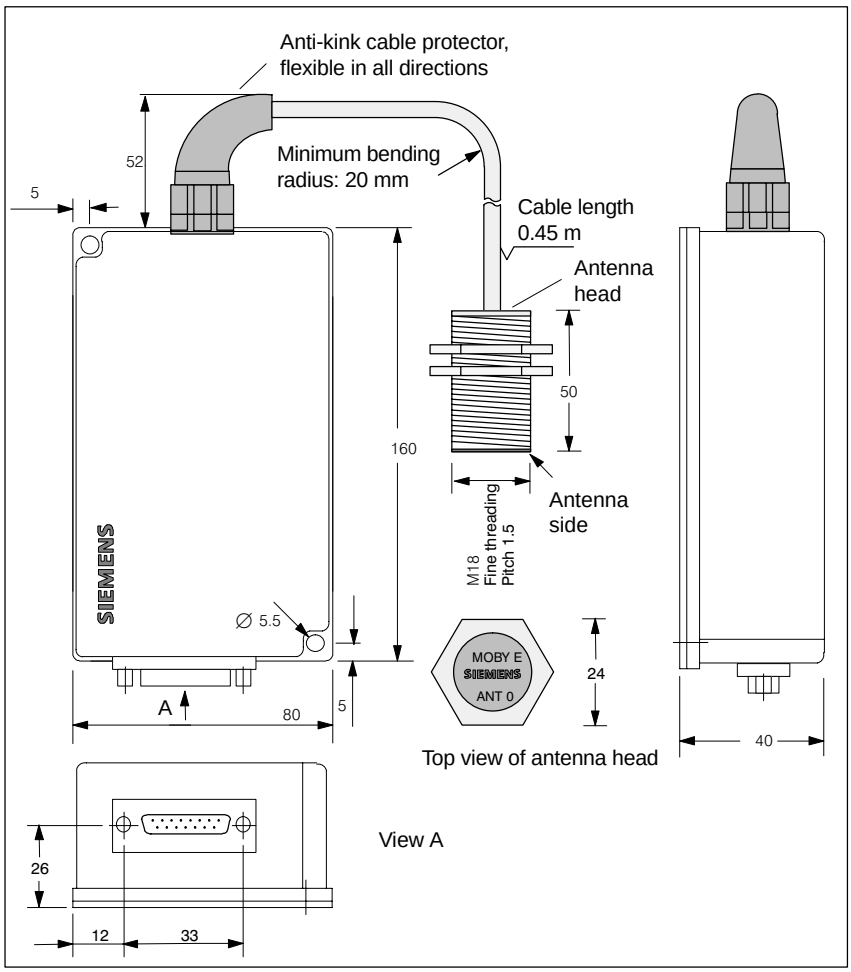


Figure 6-55 Dimensional diagram of SIM 70 ANT 0

Transmission window

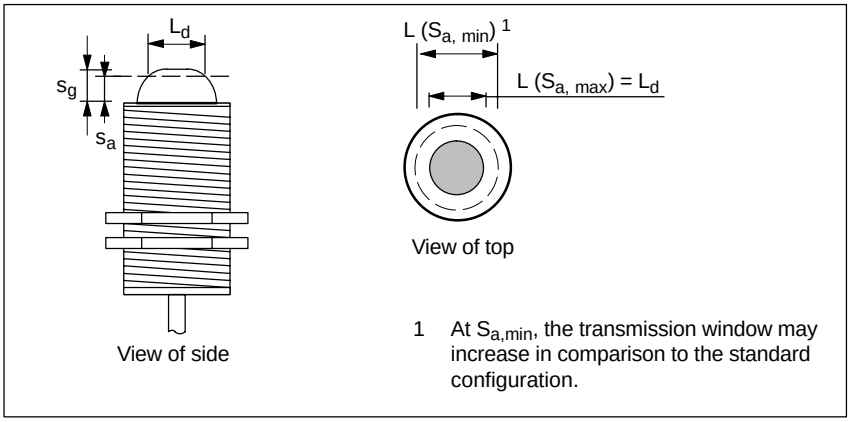

L_d
s_g
s_a
View of side
L ($S_{a, min}$) 1
L ($S_{a, max}$) = L_d
View of top
1 At $S_{a,min}$, the transmission window may increase in comparison to the standard configuration.

Figure 6-56 Transmission window of SIM 70 ANT 0

Transmission window:
To ensure reliable data communication, the antenna of the MDS must be positioned within this field.

Metal-free space

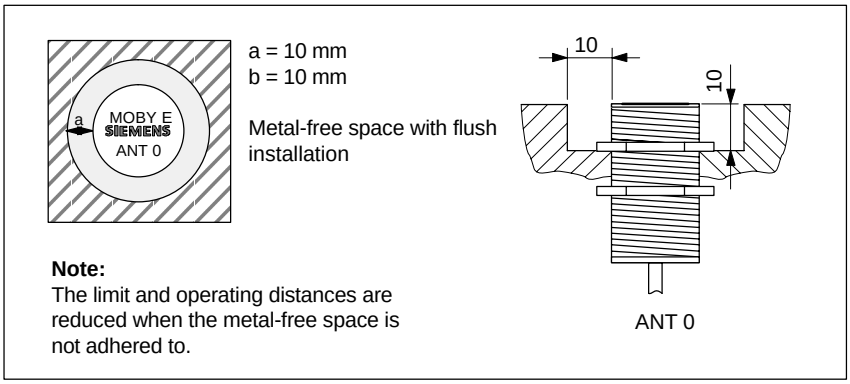


Figure 6-57 Metal-free space for SIM 70 ANT 0

FCC information

Made in Germany

SIEMENS MOBY E SIM 70 ANT 0

FCC ID: NXWMOBYE-SIM70ANT0

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES: OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

6.8.5 SIM 70 ANT 1

Figure 6-58 SIM 70 ANT 1

Ordering data

Table 6-28 Ordering data for SIM 70 ANT 1

Serial interface SIM 70 ANT 1	6GT2 305-0AB00
15-pole submin D special plug connector (socket) for IP 65	6GT2 390-1AA00
SIM-RS 232 test cable with connection line for DI/DO and connection for power supply (total length of 5 m)	6GT2 391-1DH50
Plug-in power pack, primary: 90 V to 264 V AC secondary: 24 V DC/1250 mA for SIM-RS 232 test cable	6GT2 090-0HB00
Software	See section 7.1.
Programming guide	See appendix A.

Technical data

Table 6-29 Technical data of SIM 70 ANT 1

Serial interface	RS 232 and RS 422
Transmission speed	9600 baud
Procedure	3964R (C library contains driver for PC)
Plug-in connection	15-pole submin plug connector (pin on device side)
Data line length, max.	1000 m (shielded), RS 422 30 m (shielded), RS 232
Antenna line length, max.	0.45 m

Table 6-29 Technical data of SIM 70 ANT 1

Software functions	MDS: Read, write, initialize, access rights, multitag (see programming guide)
Programming	Depends on computer, PC, PLC of other manufacturer
The following C libraries are available for the PC.	CCT32 (Windows 95/NT 4.0) MOBY API (Windows 98/NT 4.0)
Digital input (R_i = 10 kΩ)	Via 15-pole submin D plug connector
Number	1
Input voltage for Logical “0” Logical “1”	 – 2 V < log 0 < 5 V [1] 12 V < log 1 < 33 V [1]
Non-floating	Yes
Digital outputs	Via 15-pole submin D plug connector
Number	1 (power output) I_{max} = 500 mA At 24 V (output voltage of 22 V)
Input voltage for Logical “0” Logical “1”	 < 2 V at 50 Ω 22 V at 50 Ω (I_{max})
Galvanic isolation	No
Short-circuit proof	Yes
Inductive interface to the MDS (SLG integrated)	
Read/write distance, max	100 mm (see field data)
Transmission frequency	13.56 MHz
Supply voltage Nominal value Permissible range	 24 V DC 12 to 30 V DC [1]
Current consumption at room temperature Without DO Switchon current, brief Operation (at 12 V) Operation (at 24 V)	 700 mA, typical 330 mA, typical 180 mA, typical
MTBF (at +40° C)	2.5 x 10^5 hours
Housing, dimensions in mm	
For antenna head (L x W x H)	75 x 75 x 20
For electronics without plug connector (L x W x H)	160 x 80 x 40
Color (Antenna) (SIM housing)	Anthracite Anthracite
Material (Antenna) (SIM housing)	Polyamide 12 Polyamide 12

Table 6-29 Technical data of SIM 70 ANT 1

Protection rating in acc. w. EN 60529 SIM housing Antenna	 IP 65 (with special plug connector, 6GT2 390-1AA00) IP 67
Vibration in acc. w. EN 60721-3-7, class 7M2	1 g (9 to 200 Hz)[2] 1.5 g (200 to 500 Hz)[2]
Shock in acc. w. EN 60721-3-7, class 7M2 Total shock response spectrum, type II	 30 g[2]
Mounting of the SIM Mounting of the antenna Tightening moment (at room temperature)	2 M5 screws 2 M5 screws ≥ 2 Nm
Ambient temperatur During operation During transportation and storage	 -25 ° C to + 70 ° C -40 ° C to + 85 ° C
Weight, approx.	620 g

1 Voltage measured on SIM

2 **Warning:** The values for shock and vibration are maximum values. They should not be allowed to occur on a continuous basis.

Transmission window

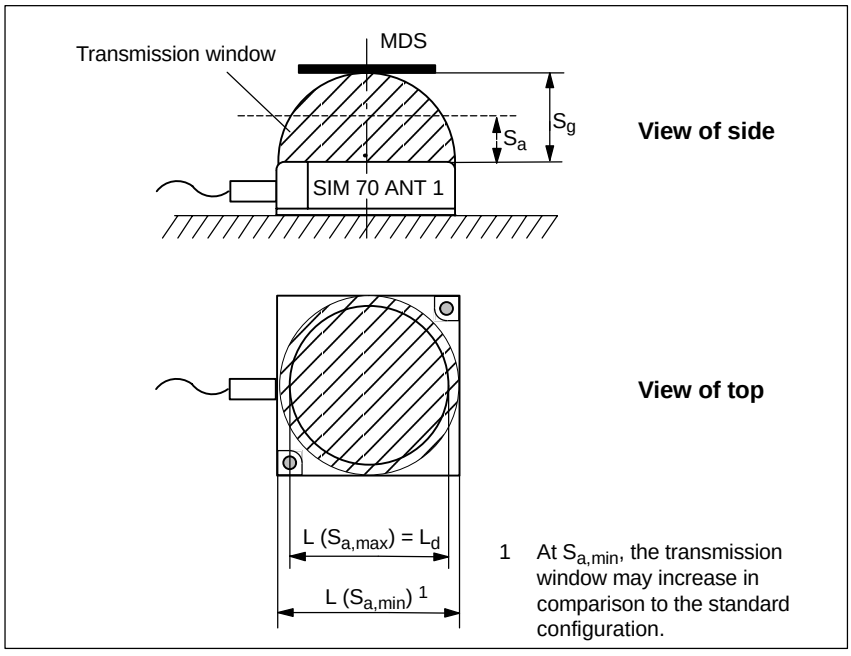


Figure 6-59 Transmission window of SIM 70 ANT 1

Metal-free space

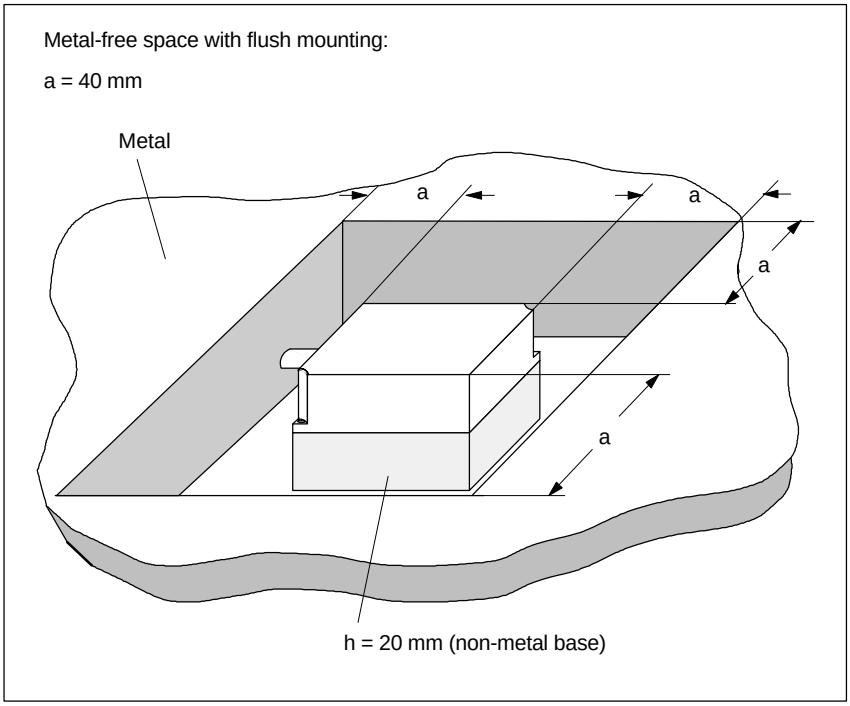


Figure 6-60 Metal-free space of SIM 70 ANT 1

FCC information

Made in Germany

SIEMENS MOBY E SIM 70 ANT 1

FCC ID: NXWMOBYE-SIM70ANT1

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES: OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of distance D

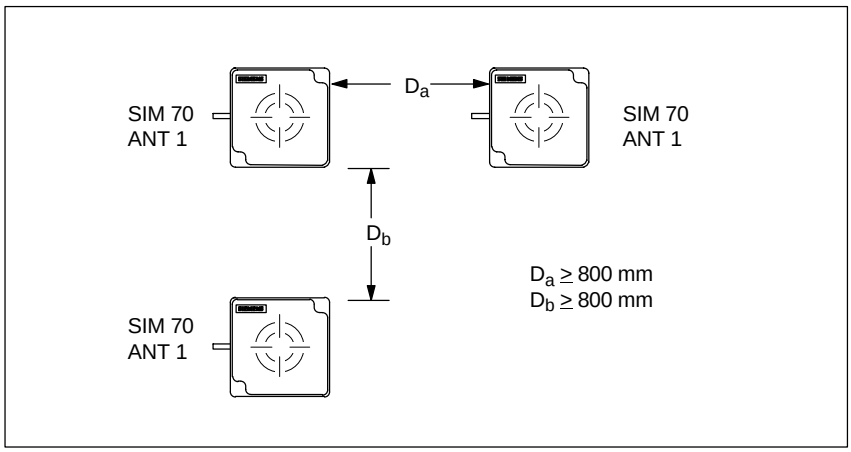


Figure 6-61 Distance D: SIM 70 ANT 1

Dimensions (in mm)

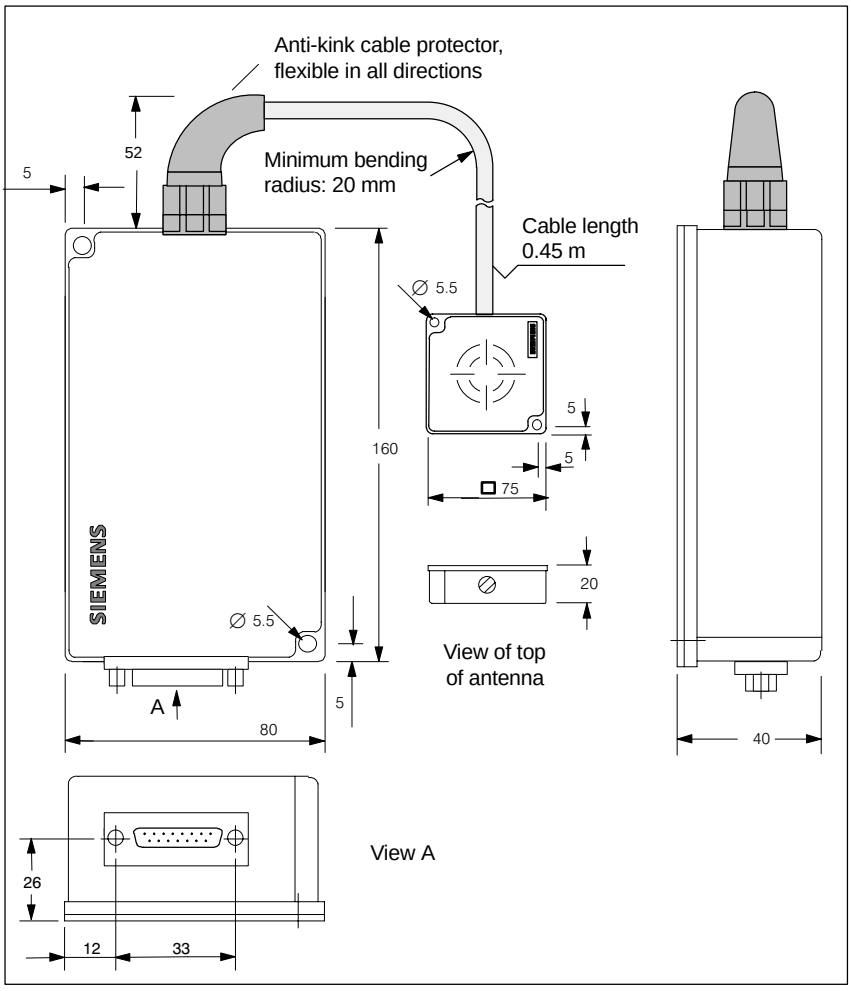


Figure 6-62 Dimensional diagram of SIM 70 ANT 1

6.8.6 SIM 72

Figure 6-63 SIM 72

Ordering data

Table 6-30 Ordering data for SIM 72

Serial interface SIM 72	6GT2 305-0CA00
15-pole submin D special plug connector (socket) for IP 65	6GT2 390-1AA00
SIM-RS 232 test cable with connection line for DI/DO and connection for power supply (total length of 5 m)	6GT2 391-1DH50
Plug-in power pack, primary: 90 V to 264 V AC secondary: 24 V DC/1250 mA for SIM-RS 232 test cable	6GT2 090-0HB00
Software	See section 7.1
Programming guide	See appendix A

Technical data

Table 6-31 Technical data of SIM 72

Serial interface	RS 232 and RS 422
Transmission speed	9600 baud
Procedure	3964R (C library contains driver for PC)
Plug-in connection	15-pole submin plug connector (pin on device side)
Data line length, max.	1000 m (shielded), RS 422 30 m (shielded), RS 232

Table 6-31 Technical data of SIM 72

Software functions	MDS: Read, write, initialize, access rights, multitag (see programming guide)
Programming	Depends on computer, PC, PLC of other manufacturer
The following C libraries are available for the PC.	CCT32 (Windows 95/NT 4.0) MOBY API (Windows 98/NT 4.0)
Digital inputs (R_i = 10 kΩ)	Via 15-pole submin D plug connector
Number	2
Input voltage for Logical “0” Logical “1”	 – 2 V < log 0 < 5 V [1] 12 V < log 1 < 33 V [1]
Non-floating	Yes
Digital outputs	Via 15-pole submin D plug connector
Number	1 (power output) I_{max} = 500 mA At 24 V (output voltage of 22 V)
Input voltage for Logical “0” Logical “1”	 < 2 V at 50 Ω 22 V at 50 Ω (I_{max})
Galvanic isolation	No
Short-circuit proof	Yes
Inductive interface to the MDS (SLG integrated)	
Read/write distance, max	100 mm (see field data)
Transmission frequency	13.56 MHz
Supply voltage Nominal value Permissible range	 24 V DC 12 to 30 V DC [1]
Current consumption at room temperature Without DO Switchon current, brief Operation (at 12 V) Operation (at 24 V)	 700 mA, typical 330 mA, typical 180 mA, typical
MTBF (at +40° C)	2.5 x 10^5 hours
Housing, dimensions in mm For electronics without plug connector (L x W x H)	 160 x 80 x 40
Color	Anthracite
Material	Polyamide 12
Protection rating in acc. w. EN 60529	IP 65 (with special plug connector, 6GT2 390-1AA00)
Vibration in acc. w. EN 60721-3-7, class 7M2	1 g (9 to 200 Hz)[2] 1.5 g (200 to 500 Hz)[2]

Table 6-31 Technical data of SIM 72

Shock in acc. w. EN 60721-3-7, class 7M2 Total shock response spectrum, type II	30 g[2]
Mounting of the SIM Tightening moment (at room temperature)	2 M5 screws ≥ 2 Nm
Ambient temperatur During operation During transportation and storage	 -25° C to + 70° C -40° C to + 85° C
Weight, approx.	550 g

1 Voltage measured on SIM

2 **Warning:** The values for shock and vibration are maximum values. They should not be allowed to occur on a continuous basis.

Transmission window

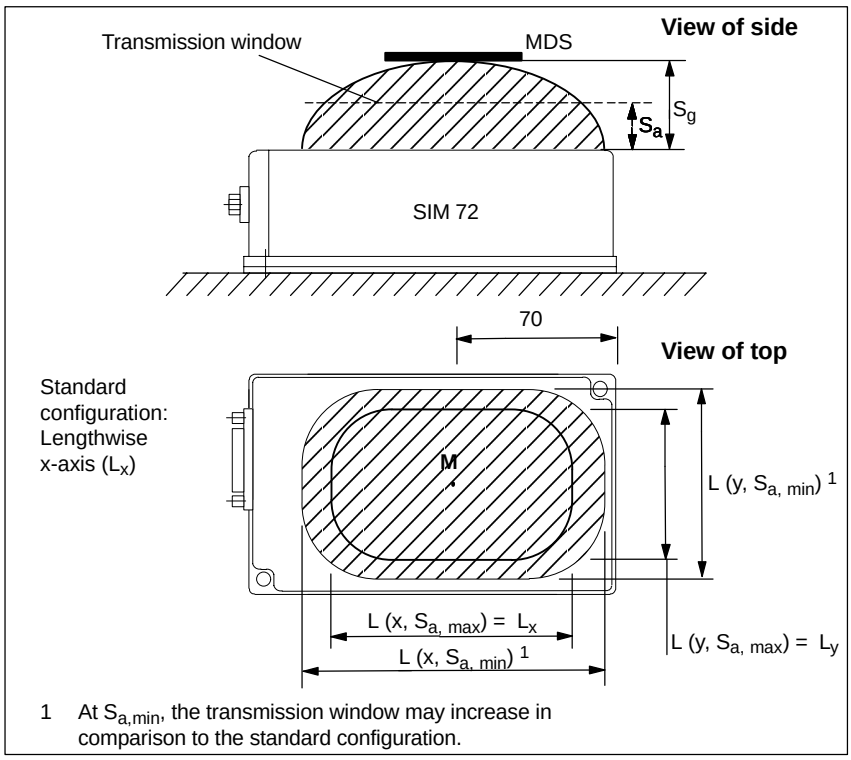


Figure 6-64 Transmission window SIM 72

Metal-free space

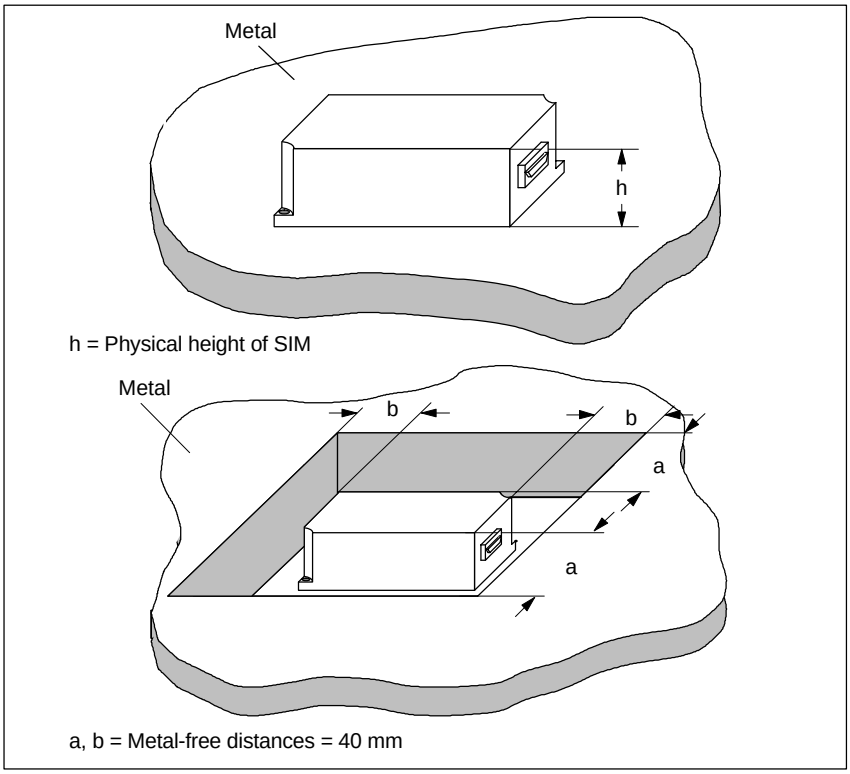


Figure 6-65 Metal-free space of SIM 72

FCC information

Made in Germany

SIEMENS MOBY E SIM 72

FCC ID: NXWMOBYE-SIM72

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES: OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of distance D

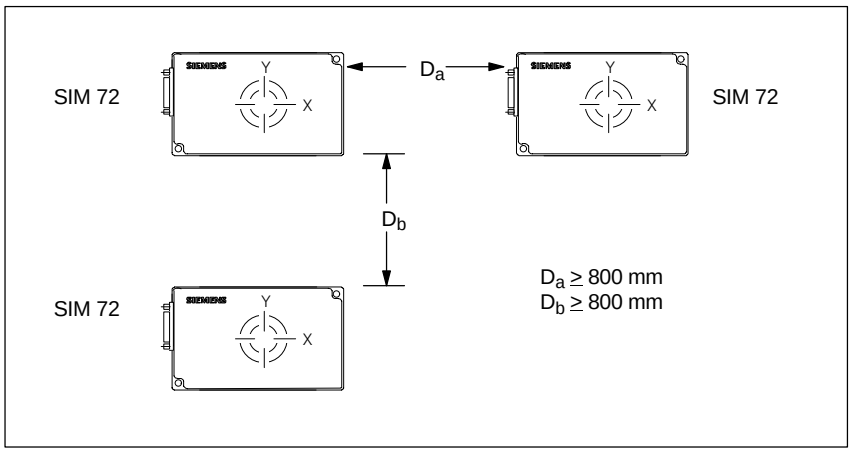


Figure 6-66 Distance D: SIM 72

Dimensions (in mm)

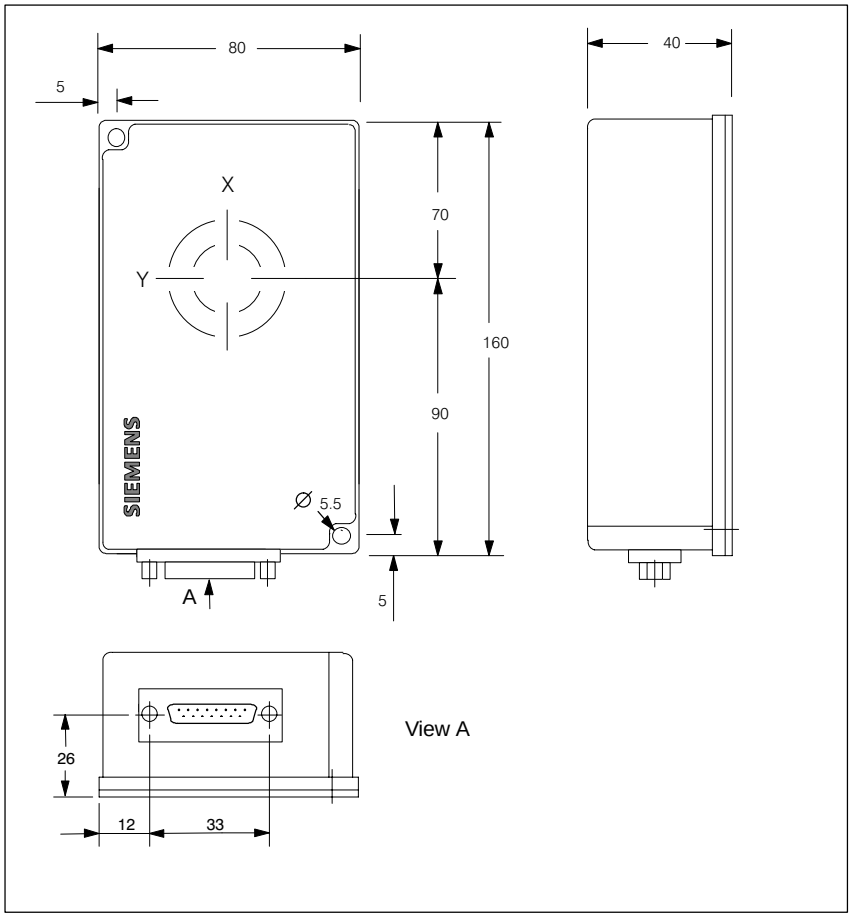


Figure 6-67 Dimensional diagram of SIM 72

Accessories

7

7.1 MOBY Software

Starting with version 3.0, the “MOBY Software” product is delivered on CD. It includes all function blocks and drivers for MOBY. The “readme” file in the main directory of the CD offers a short description of the programs.

- FB 240: Function block for ASM 450; MOBY on PROFIBUS-DP with SIMATIC S5 (including master device file for PROFIBUS-DP)
- FB 250: Function block for ASM 400
- FB 41 contains a function block for the ASM 410. The call interface of this function block is almost identical to that of FB 250.
  See the description of FB 250 for programming the ASM 440.
- FC 44 permits the ASM 450 to be used in a SIMATIC S7 environment. Be sure to read the “Read_me” file in the FC 44 directory carefully. The description of FC 44 for ASM 450 is available for operation of ASM 450.
- FC 45: S7 function for the ASM 754
- Function FC 47 for ASM 470
- FB 47 contains a function block for the SIMATIC S5-115U to 155U. It permits the ASM 470 to be used in a SIMATIC S5 environment with an ET 200M.
- Loading program for ES 030 and a master device file for connection of the ES 030 to PROFIBUS-DP
- Test and demonstrator programs for presenting the functions (e.g., “read from MDS”, “write to MDS” and so on) on a PC (Windows). MOBY modules ASM 420 or SIM are connected by a serial interface cable to the PC (i.e., COM1 or COM2).
- Brief explanations of the individual directories in German or English. Cf. “les_mich.txt” or “read_me.txt”.
- 3964R driver for DOS, Windows 95 and Windows NT
- C-library CCT32 for Windows 95/NT 4.0
- C-library MOBY API for Windows 98/NT 4.0
- Current release of MOBY documentation in pdf format
- Tools: Useful programs for MOBY configuration

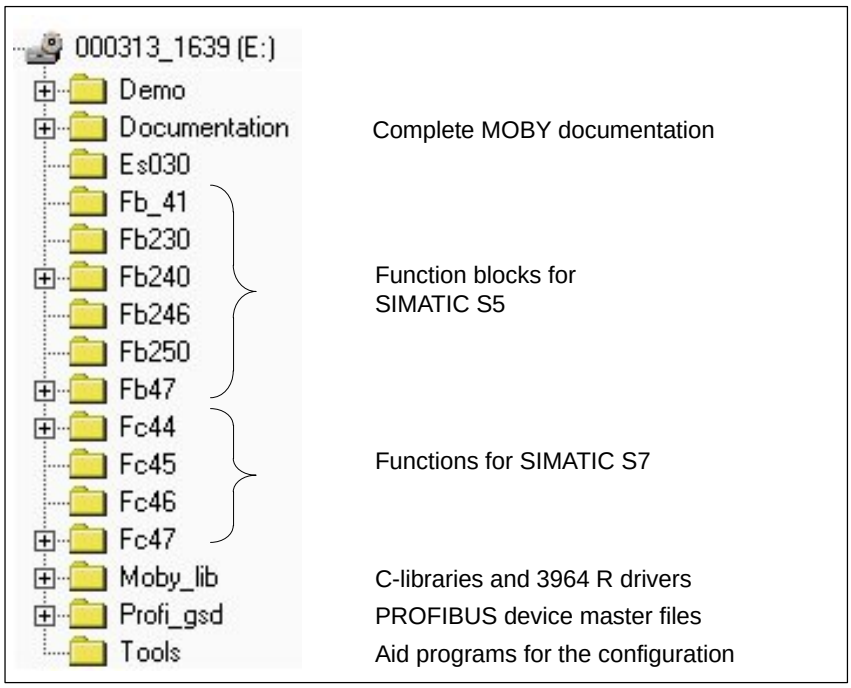


Figure 7-1 Program directories of “MOBY software” (version V 3.0)

Software products/ function blocks/ drivers

The applicable software must always be purchased once for every SIMATIC controller or for every PC on which the MOBY software is run.

Although the price of the function block is included when an interface is purchased, the function block must be ordered with a separate item in the “BZ”. For the environment’s sake, only as many function blocks should be ordered as programmable controllers used in the system.

When ordering with a separate “BZ”, the function blocks are only free of charge when the number of the original “BZ” is specified.

When a function block is required but no device is ordered, the price indicated in the price list will be charged.

The agreement pertaining to the use of one-time-purchase software products applies.

C-library CCT32

The import library is written in C++.
The following functions are supported.

- Read MDS
- Initialize MDS
- Write MDS
- Password protection and access rights
- Multi-tag recognition
- Personalization of the cards
  (only with the hardware of the MIFARE demo kit)

Driver software is available for the 3964R protocol.

For a description of the functions, see applicable programming instructions. See also appendix A.

In addition, the C library Windows 95/NT contains a simple demo program.

C-library MOBY API

The import library is written in C++.
The following functions are supported.

- Read MDS
- Initialize MDS
- Write MDS

Driver software is available for the 3964R protocol.

The programming guide is available as a pdf file on the “MOBY Software” CD.

Ordering data

Table 7-1 Ordering data of MOBY software

	Order No.
MOBY software	6GT2 080-2AA10

7.2 Module Rack BGT 4/BGT 8

The BGT 4/BGT 8 module racks consist of an attractive housing in which the module rack, power pack and backplane bus are installed.

The following MOBY interfaces can be used in one module rack.

ASM 420

Features

- Attractive, partially painted housing including module rack and power pack
- Available in 2 models (i.e., for 4 modules and for 8 modules)
- Integrated voltage supply (230 V AC, 24 V DC; 10 A)
- Integrated fan
- Internal bus wiring for 4 interfaces
- Plug connector PCB with 4 or 2 x 4 serial interfaces
- Maximum of 8 ASMs can be connected.
- Can be used with several physically different interfaces
- Multiplex operation with TTY, RS 485 and PROFIBUS-DP interfaces can be parameterized via plug-in PCB.

Ordering data

Table 7-2 Ordering data for BGT 4/BGT 8

	Order No.
BGT 4/BGT 8 module rack with power pack (without dummy covers)	
• For 4 ASM 420	6GT2 090-0KA00
• For 8 ASM 420	6GT2 090-0LA00
Description of the 4/8-module rack	
German	6GT2 097-3AK00-1EA1
English	6GT2 097-3AK00-1EA2
Dummy cover for module rack	6GT2 090-0LA10

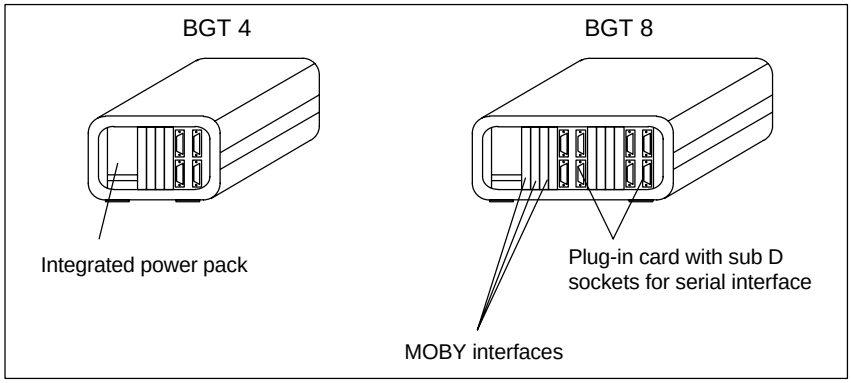


Figure 7-2 BGT 4/8 module rack

Technical data

Table 7-3 Technical data of BGT 4/BGT 8

Supply voltage	
Via internal power pack	
• Primary	230 V AC, 50 to 60 Hz
• Secondary	24 V DC, 10 A
Length of the power supply cable (approx.)	2.8 m
Power pack classification	
• Overvoltage resistance	VDE 0160/2
• Safety of data processing equipment including electrical office machines	VDE 0805, EN 60950
• Interference suppression of HF devices	VDE 0871/B, EN 55022/B
Plug connector PCB	
Connections	4 sub D sockets
Dimensions (W x H x D) in mm	
• BGT for 4 interfaces	257 x 147 x 315
• BGT for 8 interfaces	364 x 147 x 315
Material	Steel plate
Protection rating in acc. w. IEC 529	IP20
Ambient temperature	
During operation	0° to +55° C
During transportation and storage	-40° to +70° C

7.3 Plastic Housing for ASM

The following MOBY interfaces can be used in the plastic housing.

ASM 420

This housing is designed for desk and wall mounting. The voltage supply for the electronics is provided by a 230 V plug-in power pack. The power pack supply one ASM and the connected SLG. Connections to the user and to the SLG are subminiature D plug connections.

Ordering data

Table 7-4 Ordering data for plastic housing for ASM

	Order No.
Desktop housing for ASM 420 (including power pack)	6GT2 090-0MA00
Desk-top housing (without power pack)	6GT2 090-0MA10
Plug connector power pack	6GT2 090-0HB00
Plug-in line for PC RS 232; 5 m	6GT2 091-1BH50

Technical data

Table 7-5 Technical data of plastic housing for ASM

Voltage supply	
Via internal power pack	
• Primary	230 to 240 V AC, 50 Hz
• Secondary	24 V DC, 1.2 A
Length of the connection cable	2 m
Connections	
SLG	9-pin sub D (from ASM)
PC	25-pin sub D
DI/DO	2 9-pin sub D
Dimensions (W x H x D) in mm	140 x 40 x 222
Material	ABS
Protection rating in acc. w. IEC 529	IP20
Ambient temperature	
During operation	0° to +55° C
During transportation and storage	-40° to +70° C

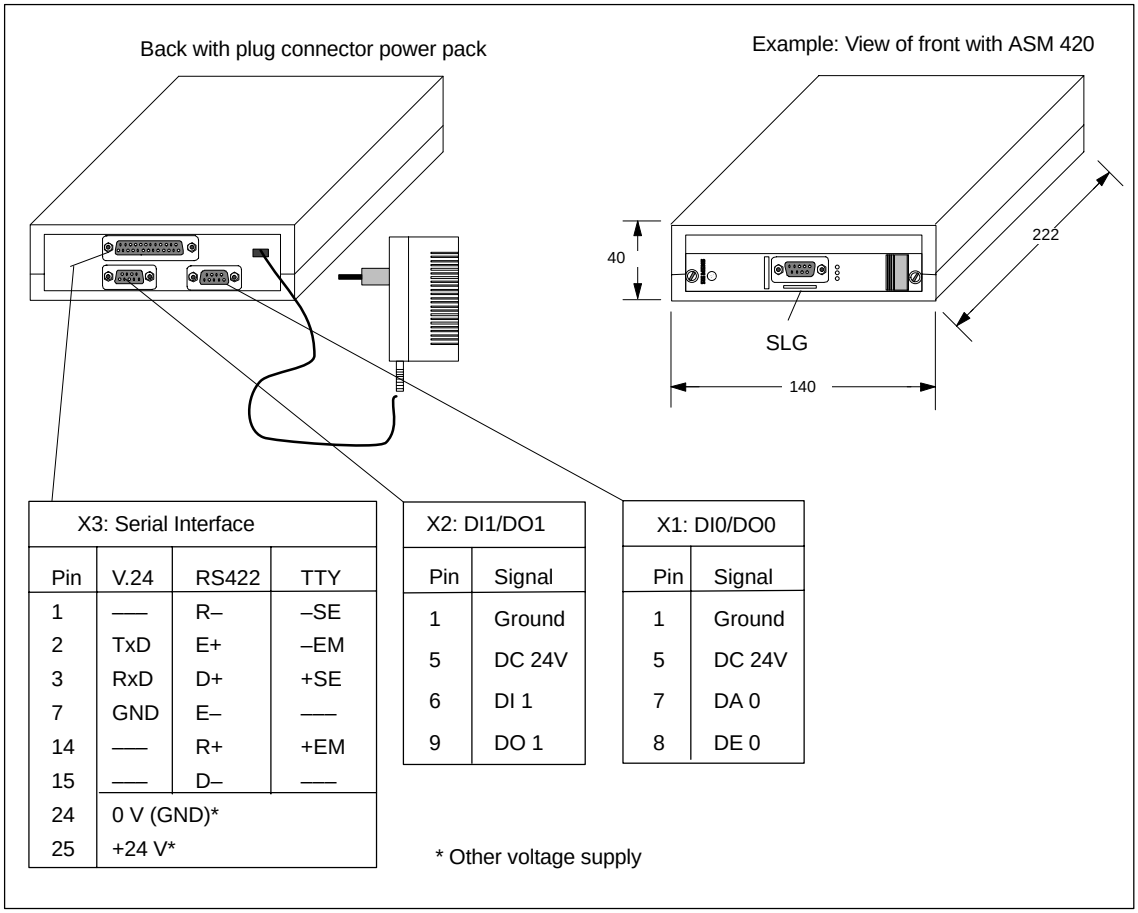


Figure 7-3 Plug connector assignment and dimensions

7.4 MOBY Wide-Range Power Supply

Description

The MOBY® wide-range power pack is a compact, primary-pulsed power supply. It is designed for use on single-phase, alternating current networks with two DC outputs (socket connector, parallel circuited).
Its robust construction features an aluminum housing which gives the fine-tuned system physical strength while protecting it from electromagnetic interference and providing it with optimal heat dissipation.
A built-in current limitation circuit protects the primary-pulsed power supply against overload and ensures continuous short circuit resistance.
The integrated overvoltage protection (SIOV) which is standard protects the connected electronics from excessively high voltage.

Figure 7-4 MOBY wide-range power pack

Ordering data

Table 7-6 Ordering data of the MOBY wide-range power pack

	Order No.
MOBY wide-range power pack, 100 to 230 V AC/24 V DC/2.2 A; incl. 2 counterplugs for the output voltage	6GT2 494-0AA00
24 V stub line for ASM 724, ASM 754; length: 5 m	6GT2 491-1HH50

Technical data

Table 7-7 Technical data of MOBY wide-range power pack

Input	
Input voltage	
Nominal value	100 to 230 V AC
Range	90 to 253 V AC
Frequency	50/60 Hz
Input current	0.85 to 0.45 A
Efficiency	≥ 80% at full load
Power connection	2 m power line with protective contact connector
Power failure backup	≥ 10 msec
Undervoltage switchoff	Yes
Overvoltage protection	SIOV

Table 7-7 Technical data of MOBY wide-range power pack

Output	Socket contacts
Nominal output voltage	24 V DC
Nominal output current	2.2 A
Residual ripple	20 mV_{ss} Up to 160 kHz 50 mV_{ss} Greater than 160 kHz
Startup current limitation	NTC
Continuous short circuit protection	Yes
Ambient conditions	
Ambient temperature	
During operation	-20° to +40° C (max. of +60° C; see notes on safety)
During transportation and storage	-40° to +80° C
Cooling	Convection
General specifications	
Dimensions of power supply incl. mounting plate (L x W x H) in mm	205 x 80 x 60 (without connection plug)
Weight	Approx. 1000 g
Color	Anthracite
Electromagnetic compatibility	
Interference emission (EN 50081-1)	Class B in acc. w. EN 55022
Interference immunity (EN 50082-2)	EN 61000-4-2
Safety	
Certifications	CE, GS
Electrical safety check	EN 60950/VDE 0805 and VDE 106 (part 1)
Galvanic isolation, primary/secondary	4 kV AC
Protection class	I, in acc. w. EN 60950 (VDE 0805)
Protection rating	IP 65, in acc. w. EN 60529 (only when connected)

Connector assignment 24 V output

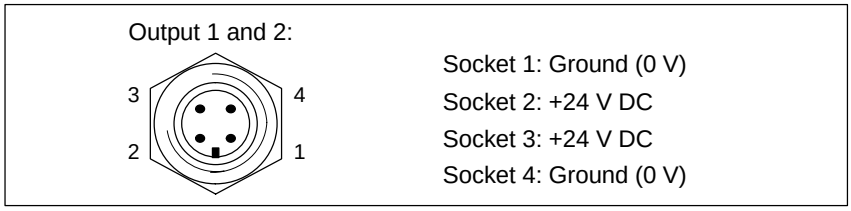


Figure 7-5 Connector assignment of 24 V output

Dimensions (in mm)

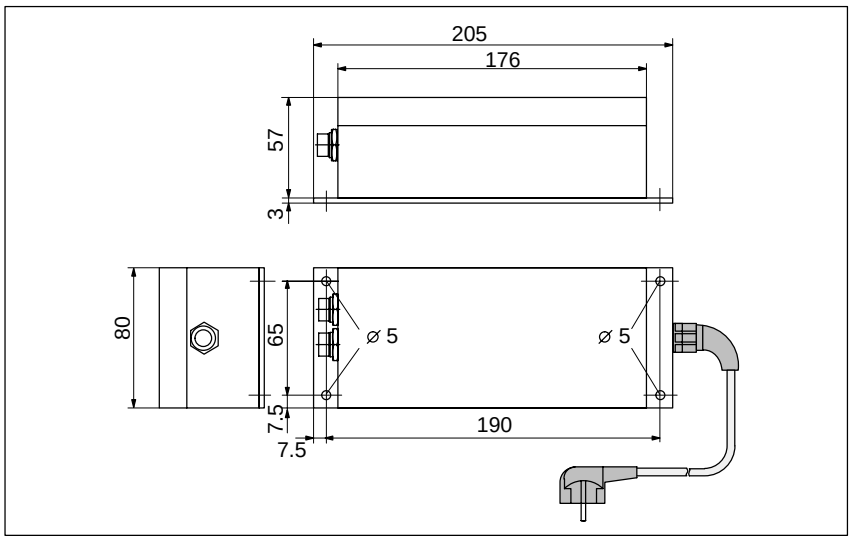


Figure 7-6 Dimensions of MOBY wide-range power pack

Notes on safety

Caution

Do not open the devices or modify them.
Non-adherence will invalidate CE certification and the manufacturer's warranty. When installing the power pack, adhere to the applicable DIN/VDE regulations of your country.
The application area of the power pack is limited to "information technology of electrical office equipment" as stated in the standard EN 60950/ VDE 0805.
Devices may only be commissioned and operated by qualified personnel. For the purposes of the safety notes on this product, qualified personnel are those persons who are authorized to commission, ground and tag devices, systems and electrical circuits in accordance with safety standards. The device may only be used for the applications described in the catalog and technical description and only in connection with devices and components recommended by Siemens. If devices and components of other manufacturers are used, they must be recommended or approved by Siemens.
Correct operation of the product requires proper storage, setup and mounting, and careful operator control and maintenance.
When installing, make sure that the power outlet socket can be easily accessed. During operation, the housing may heat up to +40° C. This is no cause for concern. However, at an ambient temperature of more than +40° C, be sure to cover the power pack (power pack must still receive sufficient ventilation) so that people cannot touch the hot housing.

7.5 Wide-Range Plug Connector Power Pack

The MOBY wide-range plug connector power pack is designed for use on single-phase alternating current networks with a DC output (socket plug connector). The primary-pulsed power supply is protected against overload with a built-in current limitation circuit and is permanently immune to short-circuiting. The integrated overvoltage protection protects the connected electronics from excessively high voltages.

Technical data

Table 7-8 Technical data of the wide-range plug connector power pack

Input voltage range	90 V to 264 V AC (wide-range input)
Frequency range of the input voltage	47 Hz to 63 Hz
Nominal input current	700 mA
Nominal output voltage	24 V DC
Nominal output current	1.25 A
Basic load	None
Short-circuit immunity	Yes
Ambient temperature for transportation, storage and operation	0° to +40° C with 90% humidity, no condensation
Power supply dimensions in mm (L x W x H)	105 x 68 x 39 (without connection plug)
Output cable	2 x 0.75 mm / 2 m in length
Primary plug connector can be changed	Euro plug, UK plug, USA plug (included)
Housing material	Plastic (PPEV1)
Color	Black
Weight	Approx. 260 g
CE	Yes
UL	Yes
Interference emission	EN 55011, 55014 and 55022/B
Interference immunity	EN 61000-4-2 to -4-6
Electrical safety test	In acc. w. EN 60950
Galvanic isolation, primary/secondary	3 kV AC
Protection class	2 in acc. w. EN 60950 (VDE 0805)
Protection rating	IP 30 in acc. w. EN 60529

Ordering data

Table 7-9 Ordering data for the wide-range, plug-in, power pack

	Order No.
Wide-range, plug-in, power pack, 90 to 264 V AC/24 V DC; 1.25 A	6GT2 090-0HB00
Connection cable, RS 232 PC ↔ SIM	6GT2 391-1DH50

7.6 MOBY STG E Hand-Held Terminal

Application areas

The STG E adds to the MOBY E identification system a powerful mobile hand-held terminal for applications in the areas of logistics, distribution and service. The service and test device (STG E) is an indispensable aid for commissioning and testing. All MOBY E data memories can be read and write-accessed inductively.

Figure 7-7 MOBY STG E hand-held terminal

Setup and function

The STG E mobile hand-held terminal consists of a basic device (PSION Workabout^{mx}) and a plug-in compact read/write head. It has a housing which is protected against splashed water (IP54), an LCD monitor screen with 240 x 100 pixels, an alphanumeric keyboard and various interfaces (for EEPROM card, charging battery, RS 232/TTL for MOBY E read head, battery charging interface including RS 232 for the PC coupling, and so on).
The included MOBY software (memory card) provides service and test functions for reading, writing, etc. of all MOBY E data memories.

- Read data from the data memory
- Write data to the data memory
- Read and display the ID number of the data memory
- Present and edit the data in hexadecimal or ASCII format
- Enable/disable password protection

Using the optional C library as a basis, it is very easy to program your own applications including a customized screen user interface for reading and writing data memories. Various development tools are available for the PC, and a large selection of accessories is available directly from PSION. New applications are opened up in the area of logistics and distribution (e.g., goods commissioning data can be recorded offline with the hand-held terminal or processed and forwarded to the PC/computer later).

Optional components

See http //www.psion.com/industrial/ on the Internet.

- 3link adapter cable to the PC for easy exchange of data between PC and PSION Workabout^{mx}
- PSION Workabout^{mx} basic device with large function keys and numeric keyboard
- Additional memory card with up to 8 Mbytes of memory
- Docking station including high-speed charging device and software for convenient data exchange between PSION Workabout^{mx} and PC

System prerequisites

The following prerequisites must be met when the library for SIBO ‘C’ (SIBO ‘C’ is the C developmental environment for the PSION Workabout) is used.

- PC — The C development package for the PSION Workabout must be installed on the PC. This development package is available directly from PSION.
  See: http://www.psion.com/industrial/.
- Hand-held terminal — The PSION Workabout with wall bracket and power pack. Use of the STG E MOBY hand-held terminal is recommended.
- PC cable — You will need a 3link adapter cable from PSION for the connection to the PC.
  See: http://www.psion.com/industrial/.
  The cable is only required if not already included with the C development package.
- C library — The following files are required: MOBY_E.H and MOBY_STG.LIB. They are supplied with the MOBY SIBO ‘C’ library from Siemens.

Note

In principle, applications can also be developed in the Basic programming language OVAL. However, you cannot use the MOBY library.

Hardware

The following figure shows the primary hardware interfaces which you can use to write your own applications.

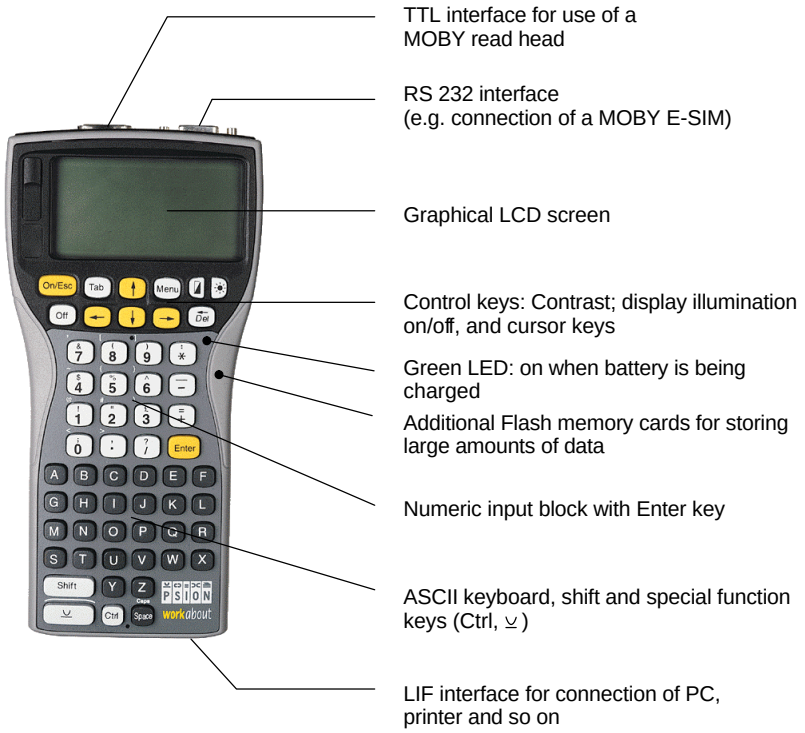

TTL interface for use of a MOBY read head
RS 232 interface (e.g. connection of a MOBY E-SIM)
Graphical LCD screen
Control keys: Contrast; display illumination on/off, and cursor keys
Green LED: on when battery is being charged
Additional Flash memory cards for storing large amounts of data
Numeric input block with Enter key
ASCII keyboard, shift and special function keys (Ctrl, ⊻)
LIF interface for connection of PC, printer and so on
On/Esc
Tab
Menu
Off
Del
Enter
Shift
Ctrl
Space
PSION
workabout

Figure 7-8 Hardware of the STG E

If you are using another type of PSION Workabout, other interfaces are also available. A few examples are listed below.

- Infrared interface
- Numeric keyboard and function keys

Ordering data

Table 7-10 Ordering data of the STG E

STG E hand-held terminal, basic device (PSION Workabout^{mx}), with MOBY E read/write head, battery, standard software incl. STG functions on EEPROM card, user's guide, without charging station	6GT2 303-0AA00
Charging station for a mobile hand-held terminal with 230 V AC, plug-in power pack	6GT2 303-1DA00
Accessories:	
MOBY E read/write head, 13.56 MHz, without software and description	6GT2 303-1AA00
Memory card with STG software and filehandler software for MOBY E, MOBY F and MOBY I, incl. user's guide	6GT2 303-1CA00
C-library for MOBY E, MOBY F and MOBY I, for development of customer-specific screen dialogs, without development tools, incl. description	6GT2 381-1AB00
Extra battery	Obtain from retailer. 2 AA batteries (NiCd, Ni-MH, alkali)
Additional PSION components (e.g., 3link cable and C developmental user interface)	Obtain from local dealer or PSION. (http://www.psion.com/industrial/)

Technical data

Table 7-11 Technical data of the STG E hand-held terminal

Hardware	
Processor	NEC V30mx 27.68 MHz, 80C86-compatible
RAM memory	2 Mbytes of which approx. 1.8 Mbytes can be used as desired
ROM memory	2 Mbytes for operating system
User program	256 Kbytes with MOBY service and test program
Monitor screen	Grafic LCD monitor screen with 240 x 100 pixels, graystage scale, backlighting can be turned on
Keyboard	Alphanumeric with 57 keys
Sound	Piezo signal encoder
Power supply	NiCd battery pack with 2 type-AA cells (850 mAh) High-speed chargeable, automatic switch-off
Operation time	20 hours (Read head inactive, display not lighted) 4.5 hours (Read head active, display not lighted) 10 hours (Read head inactive, display lighted)
Interfaces	LIF interface (LIF = Low Insertion Force) for battery charging and communication with PC and printer (3link cable not included) RS 232 and TTL interface for connection of a MOBY read head
Security	Locking mechanism for battery and program memory

Table 7-11 Technical data of the STG E hand-held terminal

Software		
Operating system	EPOC/16 multitasking, graphics support, GUI interface, Interpreter similar to MS-DOS	
File management	MS-DOS-compatible	
Integrated software	MOBY service and test program, spread sheet calculation, data base, pocket calculator, communication	
MOBY STG program	Read, write, delete MDS, read MDS-ID. Store MDS data and charge. Menus in German or English. Entry and presentation of data in ASCII or HEX.	
Technical Data	**Complete Device (Incl. Batteries)**	**Read Head**
Dimensions	260 x 90 x 35 [mm]	90 x 64 x 35 [mm]
Weight	Approx. 440 g	Approx. 110 g
Temperature	Operation: –20° to +60° C Storage: –25° to +80° C (without battery)	
Relative humidity	0% to 90%, no condensation	
Protection rating	IP 54 (protected against splashed water)	
Shock resistance	Max. height of fall onto concrete: 1 m	
EMC	EN 55022	
Electrostatic, RF, EFT	IEC 801-2; IEC 801-3; IEC 801-4	
RF Read/Write Head		
MOBY E	13.56 MHz (MIFARE)	
Max. read/write distances	MDS type	Distance in mm
	E611	30
	E600	18
	E624	10
	E623	5
	E623, installed in metal	3

7.7 Acquisition Station ES 030-K

Application area

Acquisition station ES 030-K is a microprocessor-controlled terminal for general-purpose use in all sectors of industry. It offers several interfaces. This station is particularly suitable for use with the MOBY I, E, L and M identification systems and with barcodes to lessen the load of higher-level host systems. Its modular design permits configuration of functions and design to meet the requirements of individual applications.

Features/layout

- Can be programmed as desired with PG and PC in programming language STEP5
- Dialog or process-oriented with keys which can be assigned as desired
- Sturdy construction (IP54) for industrial environments (e.g., for control even when operator is wearing protective gloves)
- Flexible hardware layout
- Serial interfaces (i.e., TTY, RS 485, (RS 422), and V.24) for connection to higher-level computers, PLCs or printer with Lauf, 3964R, SINEC L1 and PROFIBUS-DP procedures
- Additional interfaces for MOBY I, MOBY E, MOBY L and MOBY M identification systems, barcode wands, scanners and swipe readers
- Integrated function blocks for frequently used functions
- With master/slave function for SINEC L1

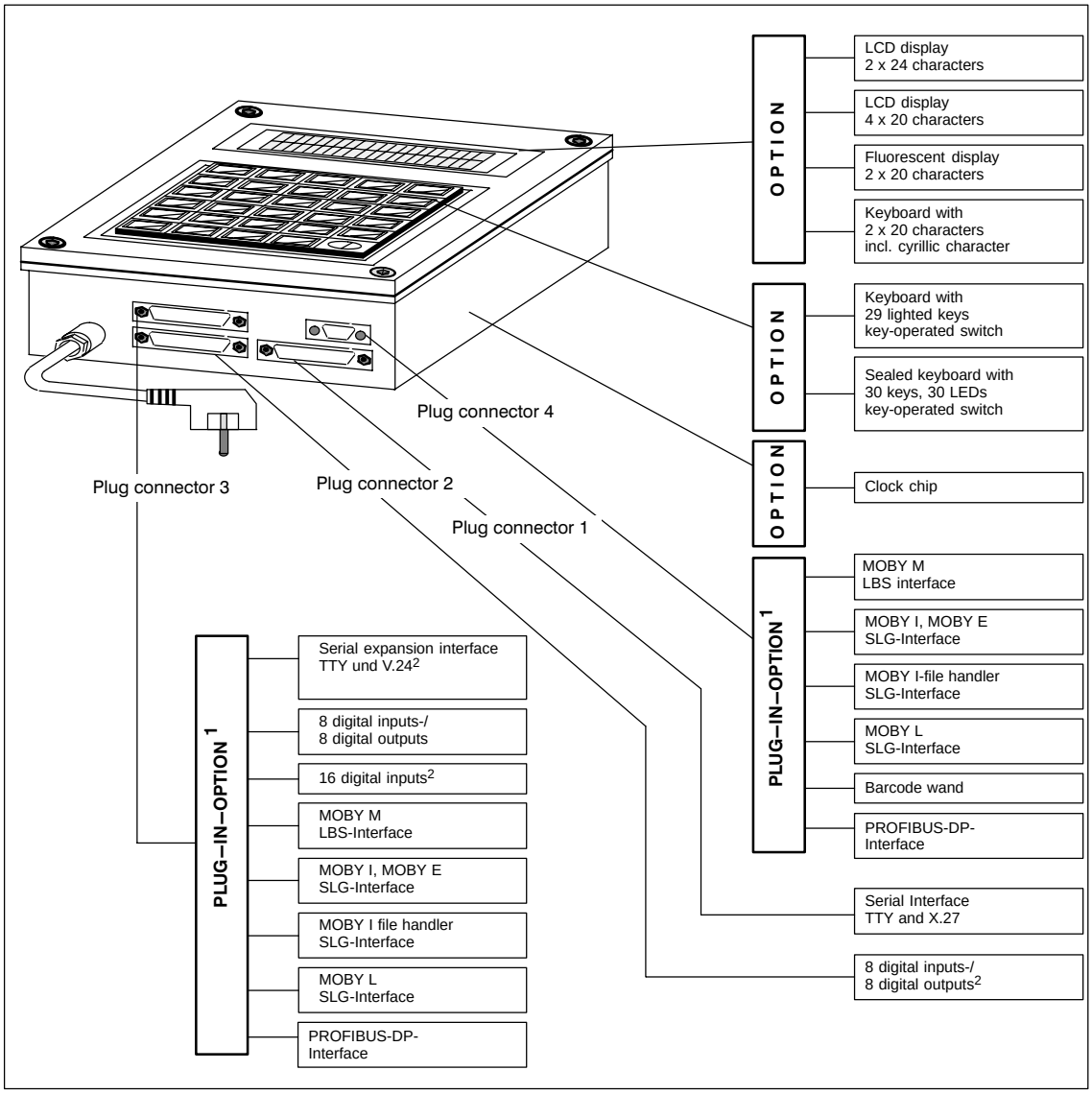


Figure 7-9 Configurator of ES 030-K

1 Each plug-in option is a hardware module requiring one slot on the ES 030-K.
2 The options “serial expansion interface” and “16 digital inputs” can also be led out on plug connector 2 as a special version.

Ordering data

Table 7-12 Ordering data ES 030-K

		Order No.
ES 030-K acquisition station with TTY, X.27 serial interface on plug connector 1 8 DI + 8 DO on plug connector 2	6AW5 451-	■ ■ ■ ■ 3
<u>Display</u>		
Without Display		0
LCD, 2 x 24 characters		1
LCD, 4 x 20 characters		2
Fluorescent display, 2 x 20 characters		3
Fluorescent display, 2 x 20 characters (incl. cyrillic font)		5
<u>Plug connector 3</u>		
Not used		A
MOBY I, MOBY E interface		C
8 DI +8 DO		D
16 DI		E
MOBY I file handler		F
MOBY L interface		L
MOBY M interface		M
PROFIBUS-DP interface[1]		P
Serial interface (TTY, V.24)		S
<u>Plug connector 4</u>		
Not used		A
Barcode (incl. wand)		B
MOBY I, MOBY E interface		C
MOBY I file handler		F
MOBY L interface		L
MOBY M interface		M
Barcode (without wand)		N
PROFIBUS-DP interface[1]		P
<u>Keyboard</u>		
No keyboard		0
Sealed keyboard, 30 keys, 30 LEDs		2
Keyboard with 29 illuminated keys		3
Loading kit for ES 030	6AW5 451-8AU	

1 Alternate: Preferably on plug connector 4

Technical data

Table 7-13 Technical data of ES 030-K

Microprocessor	
Clock pulse frequency	14.7 MHz
Storage capacity (basic model)	
EEPROM	32 Kbytes = 16 K instruction
RAM	128 Kbytes, battery-buffered for approx. 8 years (DB1-DB120)
Command set (STEP5)	Almost same as SIMATIC 100U (e.g., logical link operations, storage operations, load and transfer operations, time and counting operations, comparison operations, and processing operations
Display	20 x 20-character fluorescent display or 2 x 20-character fluorescent display with cyrillic character set or 2 x 24-character LCD or 4 x 20-character LCD
Digital inputs/outputs always included	
Always included	8 DI and 8 DO, floating
Optional module	8 DI and 8 DO, floating
Optional module	16 DI, floating
• Digital input	Logical “0”: -2 to +2 V Logical “1”: 16 to 33 V (R_i = approx. 5 kΩ) Common ground of all DI
• Digital output	Logical “1”: +24 V I = 100 mA I = 50 mA Short-circuit proof Common +24 V of all DO
Serial interface	
(plug connector 1)	TTY or RS 485
Procedure	3964R, Lauf, SINEC L1
Speed	150 to 19200 baud
Serial interface	Interface module
(plug connector 3)	20 mA single current Active/passive or V.24 Procedure: Lauf or 3964R
Fieldbus	PROFIBUS-DP (slave) certified in acc. w. part III of DIN 19245
Baud rate	9.6 kbaud to 1.5 Mbaud
Connection	9-pin sub D plug connector on plug connector 4 (optionally on plug connector 3)
Connectable barcode interface (max. of 2)	Reading wand, swipe reader, hand-held laser scanner

Table 7-13 Technical data of ES 030-K

MOBY E Connectable SLGs (max. of 2)	 SLG 70 ANT 0 SLG 70 ANT 1 SLG 72 SLG 75 ANT 12 SLG 75 ANT 30
MOBY I Connectable SLGs (max. of 2)	 SLG 40/SLG 40-S SLG 41/SLG 41-S SLG 42 SLG 43 SLG 44
MOBY L Connectable SLGs (max. of 2)	 SLG 52
Connection to SIMATIC S5	RS 485, V.24, TTY or SINEC L1
Keyboard	
Push-button keyboard	29 illuminated push-buttons 1 key-operated switch
Sealed keyboard	30 keys, 30 LEDs 1 key-operated switch
Power connection, normal	230 V AC, ±10%; 48 to 62 Hz
Optional	24 V DC (20 to 30 V)
Current consumption	Approx. 20 VA
RAM/clock backup	Backup battery for approx. 8 years
Interference suppression	Interference class B in acc. w. VDE 0871
Protection rating	IP54
Ambient temperature	
Operation	0° to +40° C
Transportation and storage	-40° to +70° C
Relative humidity	Up to 95%
Housing	Die-cast zinc
Dimensions (W x H x D) in mm	180 x 280 x 95
Weight (approx.)	5 kg

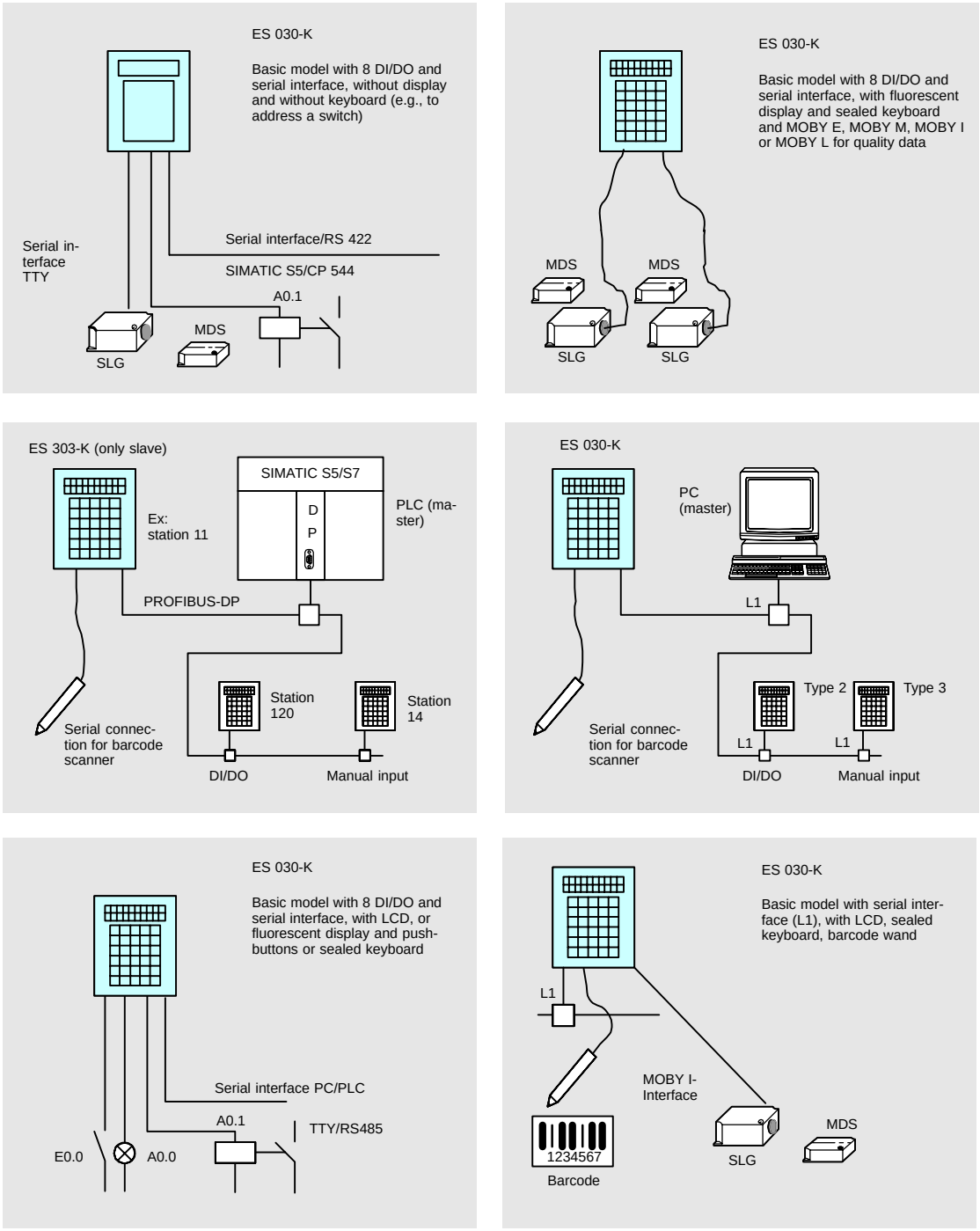


Figure 7-10 Sample configuration of ES 030-K

7.8 Ordering Data for Accessories

Plug-in lines

Table 7-14 Ordering data for plug-in lines

	Order No.
Plug-in line, prefabricated • Between ASM 400/420, ES 030-K and SLG • Between ASM 410 and SLG • Between ASM 470 and SLG	SLG plug connector Bent / Straight 6GT2 091-0A -2A 6GT2 091-0D -2D 6GT2 091-0E -2E
Plug-in line between ASM 450 and SLG, prefabricated, 2 m (standard)	6GT2 091-1CH20
Plug-in line between ASM 450 and SLG, prefabricated, 2.5 m to 20 m (optional)	6GT2 091-1C
Plug-in line, 2-core for 24 V DC voltage supply of the ASM. Plug-in line has pin cable shoes on both ends, max. of 20 m	6GT2 091-0C
Cable, without plug connector between ASM and SLG, type: 6 x 0.25 mm^2	6GT2 090-0A
RS 232 stub line between PC and ASM 724 (max. of 32 m) For length key see table 3-19.	6GT2 391-0B
24 V DC stub line for wide-range power pack 6GT2 494-0AA00 (length: 5 m)	6GT2 491-1HH50
Standard connection cable between SLA 71 and ASM 724/ASM 754 (length: 5 m, not included with the SLA 71)	6GT2 391-1AH50
Extension for antenna cable 6GT2 391-1AH50 (length: 25 m)	6GT2 391-1BN25
MOBY E SIM-RS 232 test cable with connection line for DI/DO and connection for power supply (total length: 5 m)	6GT2 391-1DH50

Plug connectors

Table 7-15 Ordering data for plug connectors

	Order No.
Plug connector ASM-side, 9-pin submin D plug connector (pins) with screw-type lock for plug-in line between an ASM 400/420 and SLG/STG	
• 1 each	6GT2 090-0BB00
• 1 package (10 each)	6GT2 090-0BB10
ASM 450 connection plug for PROFIBUS-DP and voltage supply	6ES7 194-1AA00-0XA0
MOBY E SIM plug connector 15-pole submin D special plug connector for IP 65	6GT2 390-1AA00
Plug connector ASM 450 ↔ SLG	6GT2 090-0BC00
Plug connector SLG-side, 6-pin DIN 43651 plug connector with socket contacts for crimping with angled output. Contact carrier must be secured at 7 locations.	
• 1 each	6GT2 090-0BA00
• 1 package (10 each)	6GT2 090-0BA10
With straight output	
• 1 each	6GT2 090-0UA00
Plug connector 2-pin plug connector with screw-type connection for plug-in line up to 1.5 mm diameter for 24 V DC connection (included with ASM 400)	6GT2 090-0NA00
Plug connector for voltage supply (socket) for ASM 724 and ASM 754	6GT2 390-1AB00
PROFIBUS plug connector 9-pin, submin. D plug connector for 2 stub lines	6ES7 972-0BA11-0XA0 (for other plug connectors, see ST 70 or IK 10 catalog)

Power pack

Table 7-16 Ordering data for power packs

	Order No.
Wide-range MOBY power pack, 100 to 230 V AC/24 V DC/ 2.2 A; incl. 2 counter-plugs for the output voltage	6GT2 494-0AA00
Wide-range plug connector power pack 90 V to 264 V AC, 24 V DC, 1.25 A	6GT2 090-0HB00

MDS mounting

Table 7-17 Ordering data for MDS mounting

	Order No.
Mounting bracket for MDS E600	6GT2 390-0AA00
Mounting bracket for MDS E600[1]/ MDS E611	6GT2 190-0AB00
Spacer for MDS E600/ MDS E611	6GT2 190-0AA00

1 **Note**
Use of mounting bracket 6GT2190-0AB00 for MDS E600 only together with spacer 6GT2190-0AA00

Adapter floor plate

Table 7-18 Ordering data for adapter floor plate

	Order No.
Adapter floor plate for top-hat rail mounting for ASM 724/ASM 754	6GT2 390-0BA00

Documentation

A

Descriptions, bound

Table A-1 Ordering data for descriptions

	Order No.
Description - ASM 400/401 German English	 6GT2 097-3AB00-0DB1 6GT2 097-3AB00-0DB2
Description - ASM 410 German English	 6GT2 097-3AC00-0DA1 6GT2 097-3AC00-0DA2
Description - ASM 420 German English	 6GT2 097-3AF00-0DA1 6GT2 097-3AF00-0DA2
Description - ASM 450/FC 44 German English	 6GT2 097-3AC30-0DA1 6GT2 097-3AC30-0DA2
Description - FC 45 German English	 6GT2 097-3AM00-0DA1 6GT2 097-3AM00-0DA2
Description - ASM 470/FC 47 for SIMATIC S7 German English	 6GT2 097-3AL00-0DA1 6GT2 097-3AL00-0DA2
Description - ASM 470/FB 47 for SIMATIC S5 German English	 6GT2 097-3AL10-0DA1 6GT2 097-3AL10-0DA2
Description - FB 240 German English	 6GT2 097-3AA10-0EA1 6GT2 097-3AA10-0EA2
Description - FB 250 for ASM 400/401 German English	 6GT2 097-3AA00-0DA1 6GT2 097-3AA00-0DA2
Description - 3964R for Windows 95/NT (German/English)	On “MOBY Software” CD
Description - T3964R (stapled) German English	 6AW5 450-4BX00-0K 6AW5 450-4BX00-1K
Description - 4/8-module module rack German English	 6GT2 097-3AK00-1EA1 6GT2 097-3AK00-1EA2

Manuals

Table A-2 Ordering data for manuals

	Order No.
ES 030-K manual German English	 6AW5 451-6XX01-0K 6AW5 451-6XX01-1K

Programming guides

Table A-3 Ordering data for programming guides

C/C++ library CCT32 for Windows 95/NT [1]	
German	6GT2 397-6AB00-0DA1
English	6GT2 397-6AB00-0DA2
Description – MOBY API	On “MOBY Software” CD

1 The communication specifications are described in the Windows programming guide for computers which do not use Windows (e.g., UNIX).

Error Messages

B

This chapter contains a list of MOBY I, E error messages. These messages are divided into three groups.

B.1 Error numbers 01 hex to 1F hex are described in the first section. These messages are the same for all interfaces which use direct MDS addressing.

B.2 Some function blocks (e.g., FB 250, FB 240 and FC 47) provide additional messages on the status of the hardware. These special messages are description in the second section.

B.1 General Errors

The following error codes can occur during MOBY I, E operation. They are transferred in the status byte during telegram communication or via the red LED on the front plate. On most ASM modules, this LED always indicates the last error even when this error has already been corrected.

On ASM 450, the error codes can also be optionally reported via PROFIBUS as device-related diagnoses.

Table B-1 General errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
00	00	No error. Result is okay.	0000
–	01	See error code 0F.	
01	02	Presence error. MDS has moved out of the transmission window of the SLG. The MOBY command could only be executed partially. Read command: No data are supplied to the computer. Write command: The data memory which just left the field contains an incomplete data record. → S_a (operating distance from SLG to MDS) not adhered to → Configuration error: Data block to be processed is too large (during dynamic operation). The next command (READ, WRITE or NEXT) is automatically related to the next MDS. **Remark:** The red error LED on the front plate shows error code 02.	0003
02	02	Presence error → A mobile data memory has passed by the SLG and was not processed with a command or concluded with the NEXT command. → An INIT command was aborted with RESET. This error message cannot be transferred until the next command (read, write, status, RESET, DI/DO or NEXT). The command is not executed but causes this error message. The ASM executes the next command correctly again. Error 02 is reported immediately via external diagnosis. **Remark:** The red error LED does not distinguish between errors 01 and 02. See error code 01.	0005
03	03	Error in the connection to the SLG → Supply voltage of ASM < 20 V or not connected → 24 V voltage has voltage drops. → Fuse on ASM has triggered. Check wiring. → Cable between ASM and SLG is wired incorrectly or a cable break has occurred. → Hardware defect (ASM or SLG) → Another SLG in the vicinity is active.	0040
04	04	Error in memory of the MDS The data memory has never been write-accessed or has lost its contents due to a battery failure. → Initialize data memory with STG. → With ASM: Call initialization command. → Check battery of MDS or replace MDS (battery bit). → Data memory is defective. → Initialization was performed with wrong memory size.	0041
05	05	– Unknown command code in byte 2 of the telegram – MDS reports address error. Check telegram.	0002/ 0004

Table B-1 General errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
06	06	Field interference on SLG The SLG is receiving interference pulses from its surroundings. → External interference field. The interference field can be located with the inductive field indicator of the STG: → The distance between two SLGs is too short and does not correspond to configuration guidelines. → The connection cable to the SLG has malfunctioned, is too long or does not meet specifications.	0044
07	07	Too many sending errors The MDS could not receive the command or the write data from the SLG correctly even after several attempts. → The MDS is located in the boundary area of the transmission window. → The data transmission to the MDS is being affected by external interference.	0045
08	08	CRC sending error – The monitoring circuit has detected an error during sending. → Cause same as error 06 – The MDS reports CRC errors very frequently. → The MDS is located in the boundary area of the SLG. → The MDS and/or the SLG have a hardware defect.	0044
09	09	Only for initialization. CRC error during acknowledgment receipt from MDS → Cause same as error 06	–
0A	10	Only for initialization. MDS cannot execute INIT command. → MDS is defective.	–
0B	11	Only for initialization. Timeout while initializing the MDS → MDS is located exactly on the boundary of the transmission window. → The MDS is using too much current (i.e., defective).	–
0C	12	Memory of the MDS can no longer be written. → Memory of MDS is defective. → EEPROM-type MDS was write-accessed too often and has reached the end of its life. → An incorrect end address was parameterized for the INIT command.	0046
0D	13	Address error (address area exceeded) → Specified address does not exist on the MDS: → Check and correct the command for telegram layout. → The status byte is not 00 for the command.	0002/ 0004
0E	14	ECC error The data could not be read from the MDS. → MDS data have been lost (i.e., MDS defective). → The MDS was not initialized with the ECC driver. → Initialize MDS. → MDS with EEPROM has reached the end of its life. The data have been lost. → Replace MDS. → The MDS moved out of the field during a write-access. → The MDS is not positioned correctly.	0047

Table B-1 General errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
0F	01	Startup message The ASM always sends this message after every startup. A startup is considered performed after operational voltage is applied, after the front switch is activated, after a reset via plug connector X1 or after a bus error. The startup message is retained until the user issues a RESET command to the ASM. This enables the user to recognize when voltage returns to the ASM (i.e., readiness for operation).	
10	16	NEXT command is not possible or is not permitted. → ASM is operating without the presence check. → ASM has already received a NEXT command.	1043
11	17	Short circuit or overload of the 24 V outputs Next command must be a RESET command. → The affected output is switched off. → All 24 V outputs are switched off when a total overload occurs. → A reset can only be performed by turning the supply voltage off and on again.	
12	18	Internal ASM communication error The connection to the MOBY processor has malfunctioned. Next command must be a RESET command. → Hardware of ASM is defective. → EMC interference	
14	20	Internal ASM error Stack overflow. Next command must be a RESET command. → Turn 24 V supply off and on again.	
15	21	Erroneous operational parameterization → Check switch on ASM.	
16	22	The command cannot be executed with the current bus configuration. → Input or output areas are too small for the telegram length used. → Read or write command with excessive length used → Adjust bus configuration of the master module.	
17	23	Handshake error Next command must be a RESET command.6 → The user set an incorrect bit in the command byte of the telegram during the handshake procedure. → Check user program and correct.	
18	24	Only RESET command permitted → An error has occurred which must be acknowledged with a RESET command.	

Table B-1 General errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
19	25	Previous command is active. A new command was issued to the ASM although the last command is still active. → An active command can only be terminated with a RESET command. → The new command is concluded with error 19 hex. The old command is executed by the ASM, and the finished message is reported after completion.	0042
1A	26	PROFIBUS-DP error has occurred. → Bus connection has been interrupted (e.g., wire break or plug pulled). → Master no longer addresses the ASM. → The error is reported as soon as the bus connection is restored again.	
1E	30	– The telegram does not have the correct format. – AB byte does not correspond to the user data length. → Check and correct the telegrams in the user program.	–
1F	31	Communication with the MDS was terminated with a RESET. This error can only be reported back with a RESET command.	–
20 (binary xx1x xxxx)	32	**Not an error message** Only occurs when working with the ECC driver enabled. It indicates that the driver recognized and corrected a 1-bit error. The read/write data are okay.	0052[2]
40 (binary x1xx xxxx)	64	**Not an error message** This bit is normally always set. It is reserved for the status indication of a 2nd battery on the MDS.	0051[2]
80 (binary 1xxx xxxx)	128	**Not an error message** Battery voltage of the MDS has fallen below the threshold value. Immediate replacement of the MDS is recommended. This status bit is always set for EEPROM-type MDSs. When SINUMERIK is involved, the battery message is provided in IDENTIFICATION without the “F” ID. To detect poor battery stats, the “fnr” field can be evaluated at one location for the entire system.	0050[2]

1 SIN = Equivalent error number for SIM and ASM 420 in SINUMERIK operating mode
2 When several states occur at the same time, the following sequence applies: 0052, 0050 and 0051.

B.2 ASM-Related Errors

B.2.1 ASM 400 with FB 250

The messages shown in table B-2 are indicated in data word 5 of FBDB.

Table B-2 Error messages of FB 250

Error Message	Cause/Remedy
Bit 1 = "1": **Synchronization error**	• FB 250 has received the result for a command which is not located in ZUWDB (i.e., not at this location). The pointer (ZUW) to ZUWDB may have been changed while a command was active. • EMC effects have caused the ASM to execute another command than programmed by the user. → Check the entire SIMATIC system. Check the grounding concept.
Bit 2 = "1": **FB 250 is synchronized (SYNCH)**	General communication capability with a channel module of the ASM 400 module. This bit is set after a positive check of the FB parameterization. This takes place during the 1st RESET immediately after bootstrap loading of the programs and data blocks. When a RESET command does not function, the bit is not set or reset. ASM 400 module cannot be addressed by the FB. • Wrong address set on the ASM 400 • ASM 400 is defective. → A RESET must always be performed after the sync bit is reset.
Bit 4 = "1": **Parameterization error**	• The "ADR" parameter does not contain the correct values. • The "KAN" parameter is specified incorrectly. Permitted values are 1 or 2. • The "TYP" parameter was specified incorrectly. Permitted values are 0, 1, 3, 5, and 6. • The "ANW" parameter is not "0" or "1". • The command is not permitted in ZUWDB.
Bit 5 = "1": **ASM error**	• The exact ASM error is located in bits 8 to 15 of ANZ. If bits 8 to 15 = 0: • The FB did not receive an acknowledgment from the ASM in time after command transfer. • FB 250 was not called by the user within 4 seconds after command start (no cycle FB call). • The user changed data in the FBDB (DW 0 to DW 24) - particularly DW 0/1.

Table B-2 Error messages of FB 250

Error Message	Cause/Remedy
Bit 6 = "1": **Time error**	Loop counter monitor in FB 250 has been triggered. • The command data could not be or could not be completely transferred to the ASM 400. • The ASM 400 cannot be addressed by the FB. The "ADR" parameter may not correspond to switch setting S3 on the ASM 400. • Length = 0 was transferred with a write command. • The "AG" parameter is set incorrectly. • The user has changed data in FBDB (particularly DW 0/1). → Check ASM 400 hardware, addressing parameterization and user program.
Bit 7 = "1": **Repetition error**	The command to the ASM 400 was repeated. • Error in BEST = 0 The command was not concluded correctly after command repetition (not an error). • Error in BEST = 1 Communication malfunction between ASM and FB 250. Despite command repetition, the command still could not be executed correctly. When the repetition bit is set sporadically, all hardware must be checked. Special attention should be paid to the grounding concept.
Bits 8 to 12	Error message as shown in table B-1
Bit 13 = "1"	ECC offset was performed.
Bit 14 = "1"	Dialog battery has dropped below threshold value.
Bit 15 = "1"	RAM battery has dropped below threshold value.

B.2.2 ASM 470 with FB 47/FC 47

The indication word for FC 47 is DBB 6/7.

The indication word for FB 47 is DW 3.

- MOBY errors are indicated in DBB 6 or DL 3. Cf. table B-1.
- Internal errors of the function block are indicated in DBB 7 or DR 3. Cf. table B-3. The red LED does not flash for these error messages from FB 47/FC 47. The contents of the byte are specified in hexadecimal format (i.e., HEX) and as fixed point numbers (i.e., DEC).

Table B-3 Error messages of FB 47/FC 47

ANZ (Right-Hand Byte)	Description
02 HEX/ 02 DEC	Illegal command code or command parameter was entered. • Parameterize data words in BEDB correctly in accordance with the command description.
06 HEX/ 06 DEC	• The command code and the received acknowledgment code are not identical. • Internal processing error • BEDB is being overwritten by other program segments.
07 HEX/ 07 DEC	Synchronization error during execution of FB 47/FC 47 • Internal processing error • BEDB is being overwritten by other program segments.
08 HEX/ 08 DEC	The parameterized user data length of the read/write command and the user data length received in the acknowledgment are not identical. • ASM 470 not parameterized correctly • BEDB is being overwritten by other program segments.
09 HEX/ 09 DEC	The received or written user data are too long. • ASM 470 not parameterized correctly • Read command: The length specified for the data to be read is too long. Maximum of 12 bytes is permitted.
10 HEX/ 10 DEC	Read or written user data length too short. User data length is 0 bytes. • Internal processing error • BEDB is being overwritten by other program segments.
17 HEX/ 17 DEC	The formal operands of FB 47/FC 47 were parameterized incorrectly. • Parameterize FB 47/FC 47 correctly. • Then start RESET command.

Table B-3 Error messages of FB 47/FC 47

ANZ (Right-Hand Byte)	Description
19 HEX/ 19 DEC	FB 47/FC 47 reports that only a RESET command is permitted as the next command. • No RESET was performed after a startup message of the ASM 470. • No RESET was performed after an error message after which a RESET must be the next command. • Start RESET command.
20 HEX/ 20 DEC	Synchronization error between ASM 470 and FB 47/FC 47 • The handshake of the command and acknowledgment telegrams got out of step. There may be a contact problem or the supply voltage may be unstable. • BEDB is being overwritten by other program segments. • Start RESET command.
21 HEX/ 21 DEC	ASM 470 has performed a startup. • There may be a problem with the plug-in contact of the ASM 470 in the S7-300. • Supply voltage of the ASM 470 is unstable. • Interference pulse • DEDB is being overwritten by other program segments. • Start RESET command.
1 BH/ 27D[1]	• The data field (i.e., number of user data bytes) between DAT-Z and the end of DATDB is less than the length given in the write command (DR 4 in BEDB). Exception: DATDB consists of 256 data words (DW 0 to DW 255). • DAT-Z must be adjusted to the user data length. Make DAT-Z smaller. • Reduce length of read/write data. • Start RESET command.

1 Can only occur with FB 47

B.2.3 ASM 450 with FB 240

The error indications (ANZ) of FB 240 are located in data word DW 2 of the BEDB.

- The MOBY errors listed in table B-1 are located in the left-hand byte of the data word (DL 2).
- Internal FB errors are located in the right-hand byte of the data word (DR 2). The red LED does not flash for these FB 240 error messages. The contents of the byte are specified in binary format, in hexadecimal format (H) and as fixed point numbers (D).

Table B-4 Error messages of FB 240

ANZ (Right-Hand Byte)	Description
00000010 (02H/02D)	Illegal command code or command parameter was entered. • Parameterize data words in BEDB correctly as specified in the command description.
00000110 (06H/06D)	The command code and the received acknowledgment code are not identical. • Input and output area of the ASM 450 is too small. • Parameterize master module correctly.
00000111 (07H/07D)	The received acknowledgment is too long. • Input and output area of the ASM 450 is too small (i.e., less than 32 bytes). • Read command: The length of the data to be read is too long. • Parameterize master module correctly.
00001000 (08H/08D)	The parameterized length of the user data of the read/write command and the user data length received in the acknowledgment are not identical. • Input and output area of the ASM 450 is too small. • Parameterize master module correctly.
00001001 (09H/09D)	The length of the received user data is too long. • Input and output area of the ASM 450 is too small (i.e., less than 32 bytes). • Read command: The length of the data to be read is too long. • Parameterize master module correctly.
00010001 (11H/17D)	The formal operands of FB 240 were parameterized incorrectly or the parameterization in the EPROM of IM 308-B is wrong. • Parameterize FB 240 correctly. • Parameterize master module correctly. Check the “ADR” parameter in particular. • Then start RESET command.

Table B-4 Error messages of FB 240

ANZ (Right-Hand Byte)	Description
00010011 (13H/19D)	FB 240 reports that only a RESET is permitted as the next command. • No RESET was performed after a startup message of the ASM 450. • No RESET was performed after an error message which requires a RESET as the next command. • Start RESET command.
00010100 (14H/20D)	Synchronization error between ASM 450 and FB 240 • The handshake of the command and acknowledgment telegrams got out of step. There may be a contact problem or the supply voltage may be unstable. • Start RESET command.
00010101 (15H/21D)	The ASM 450 has performed a startup or a PROFIBUS-DP bus error has occurred. • Possible problem with the ASM 450's plug-in contacts in the module rack • Supply voltage of the ASM 450 is unstable. • Interference pulse on the reset input of base connector X1 • PROFIBUS-DP error occurred (e.g., bus connection interrupted) • Start RESET command.

ASCII Table

C

dec.		+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	+13	+14	+15
	hex.	+00	+01	+02	+03	+04	+05	+06	+07	+08	+09	+0A	+0B	+0C	+0D	+0E	+0F
0	0x00																
16	0x10																
32	0x20																
48	0x30																
64	0x40																
80	0x50																
96	0x60																
112	0x70																
128	0x80																
144	0x90																
160	0xA0																
176	0xB0																
192	0xC0																
208	0xD0																
224	0xE0																
240	0xF0																

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